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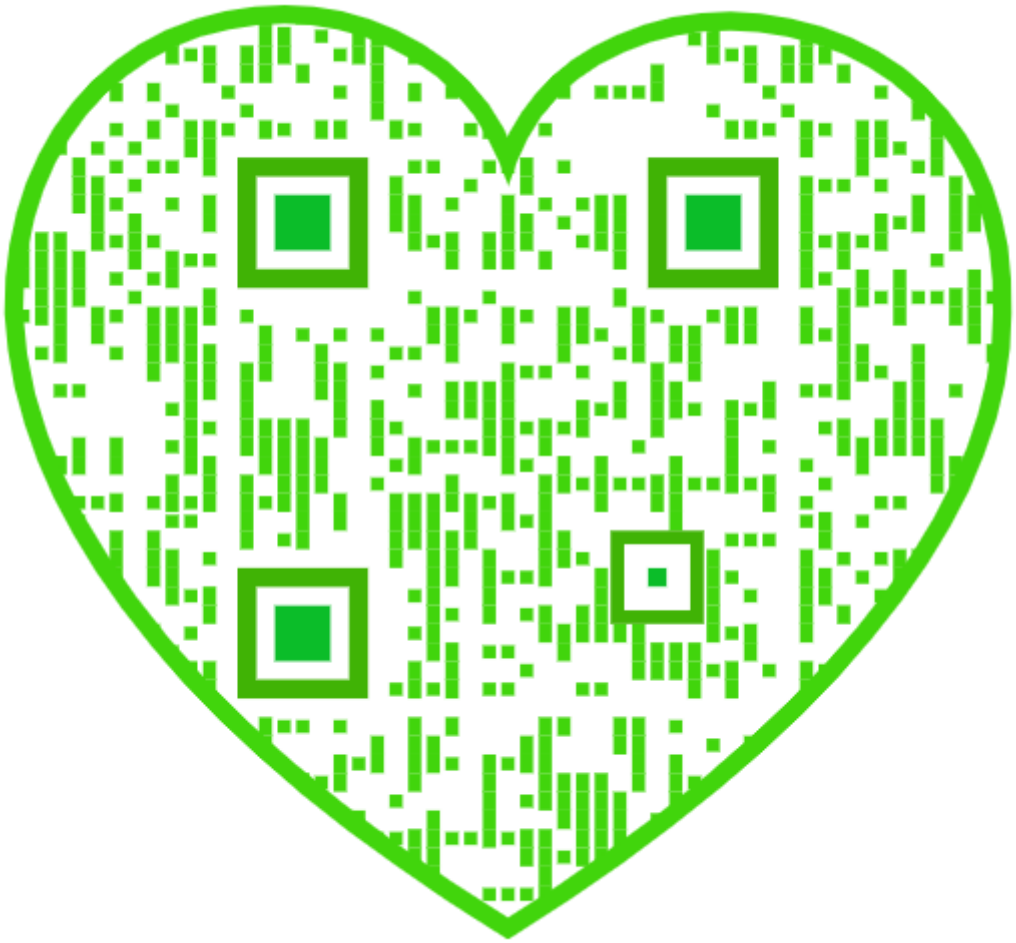

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33K09.07	"G" Gilliom (5/16" Rd.)	$11.95
33K09.08	"H" Delta 16"	$11.95

C / Garrett Wade Has Discovered Some Very Interesting Bandsaw Blades.

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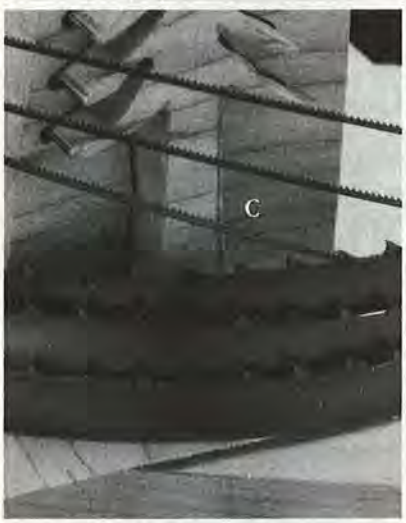

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D / Saw Setting Gauge Can Be Read From Any Position

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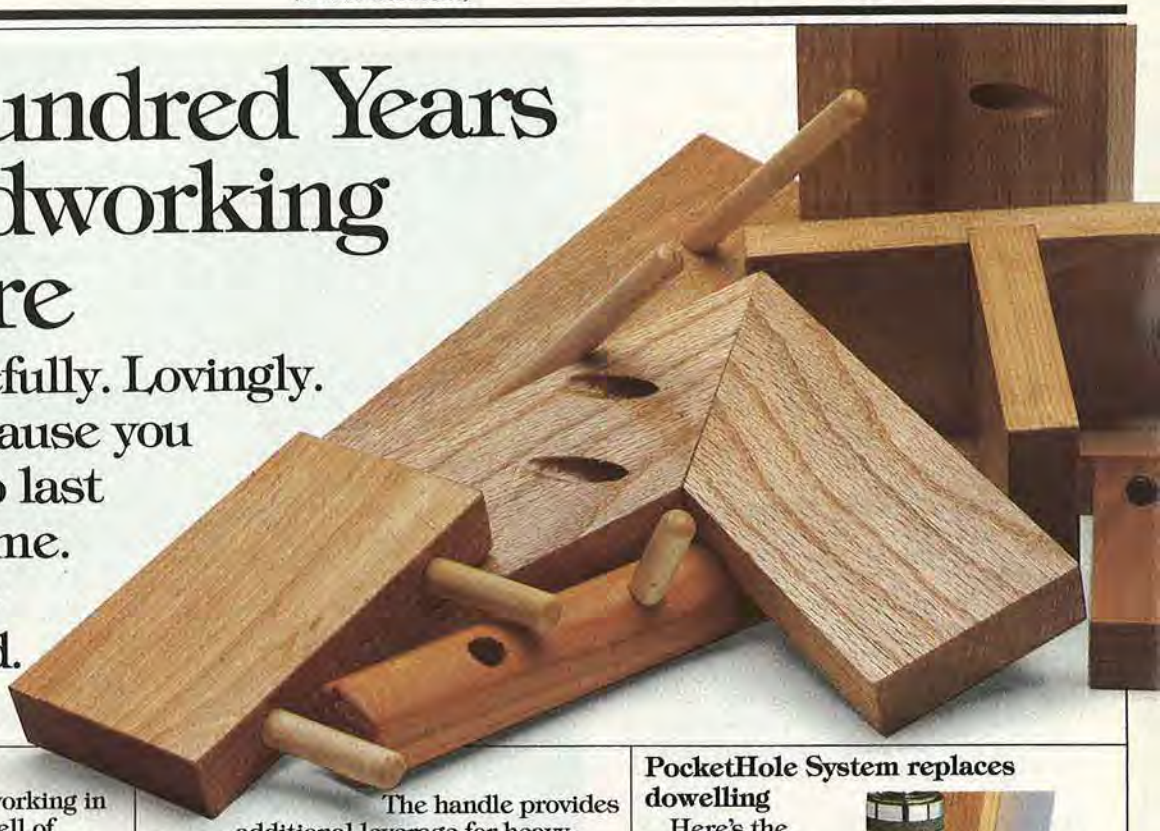

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February 1990 ● Vol. 7, No. 1 ● Issue No. 33

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SUBSCRIPTION SERVICE (including change of address): ROBERT AUSTIN, Customer Service Manager, P.O. Box 10628, Des Moines, IA 50336.

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Better Homes and Gardens® WOOD® — the magazine for home woodworkers (ISSN-0743-894X) is published bimonthly in February, April, June, August, October, and December by Meredith Corpration, 1716 Locust St., Des Moines, IA 50336. Second-class postage paid at Des Moines, Iowa. Better Homes and Gardens trademark registered in Canada and Australia. Marca Registrada en Mexico. **ONE-YEAR SUBSCRIPTION PRICES:** United States and its possessions, $18; Canada, $24; other countries, $30. **POSTMASTER:** Send address changes to WOOD, 1716 Locust St., Des Moines, IA 50336.
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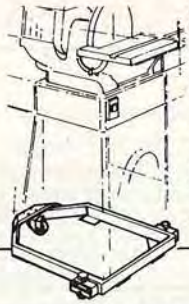

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This issue's cover wood grain: magnolia

FEBRUARY 1990 ISSUE NO. 33

WOOD PROFILE

COCOBOLO: THE CENTRAL AMERICAN WOOD THAT STANDS UP TO A DUNKING 33

Cocobolo earned its reputation as a practical, handsome wood for knife handles. Today, woodworkers add this exotic wood in many accessories.

SHOP-TESTED TECHNIQUES

5 GREAT ROUTER TRICKS 34

We asked three router experts for new and innovative techniques that the *WOOD* magazine readers could put to good use. Take a look!

THE OAK DRY SINK 40

Because lots of our readers hunger for country projects, we're confident this classic reproduction will strike the fancy of many. And, everyone should enjoy the ease of constructing the frame-and-panel doors.

ZAP! TURN GREEN WOOD IN RECORD TIME 46

Walt Panek, a reader from Kingsport, Tennessee, shares a bowl full of tips for curing green turning projects in the kitchen microwave. Don't overlook our chart to help you figure out settings for your microwave.

HEAVY-DUTY ROUTER TABLE 50

Our team of woodworkers spent weeks designing, building, and then refining this project to complement today's massive plunge routers. We're proud to report that three staff members have already built this table, and they love every minute of use in their home shops.

CRAFTSMAN CLOSE-UP

IN PRAISE OF WALKING STICKS 57

Theo Fossel, a right proper Englishman, thinks that woodworkers on this side of the Atlantic Ocean should take to stickmaking, as have so many of his countrymen. Find out why his hand-carved walking sticks have such universal appeal.

SOUTHWEST LANDSCAPE 62

On a recent scouting trip to Santa Fe, Marlen Kemmet, our how-to editor, found a great-looking accessory called "Desert Magic." It's no wonder this item remains so popular in southwest galleries.

TOOL BUYMANSHIP

ROUTERS, ROUTERS EVERYWHERE 64

If you haven't been in the market for a new router lately, you'll be amazed at all the innovations. We tested a mountain of products before Bill Krier sat down to write this article.

TURNING PATTERN

BRING ON THE BRACELETS 71

Way up north (at least for most of us), Ab Oknoken turns out appealing wooden bracelets at his lathe in Saskatoon, Saskatchewan.

FAT-CAT™ SERIES

OVER-THE-ROAD HEAVY HAULERS 72

We've got ourselves a convoy here, good buddy! With this issue, we're rolling out three more additions to our popular Fat Cat toy series.

SHORT-SUBJECT FEATURES

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THE EDITOR'S ANGLE

You asked for a CUMULATIVE INDEX, so naturally, we produced one!

Apparently, many of you are experiencing the same problem I have around here—I can't easily put my finger on all the information that has appeared in past issues of *WOOD®* magazine. With over 30 issues on my shelf, all those projects, craftsman close-up profiles, shop-tested techniques, and other articles run together in my mind. And even though we do compile indexes periodically and include them in the magazine, which helps some, they're just not as handy as I'd like. That, in a nutshell, is why we produced the all-new 28-page *WOOD Cumulative Index.*

Now, I just flip through the general index, or one of the six subject-specific mini-indexes also included, to find the article I'm interested in. Then I calmly and confidently pluck the right issue from my bookshelf and begin reading. Boy, do I ever feel organized!

To make this product even more valuable, we've included a 3-page, information-packed Quick-Reference Wood-Species chart in full color as well. You'll find it helpful when deciding which wood to use for your next projects.

And for those of you who run across interesting-sounding articles while glancing through the index, but who do not have the issue in which the article appeared, we've developed the *WOOD* Reprint-Ordering Service. You'll find easy-to-use order forms on page 25 of the index. (Refer to the October 1989 issue, page 107, for how to order the Cumulative Index. Or, call 800-678-2666, and tell our customer-service people what you need.

Hot off the press . . . and fresh from the factory

I'd also like to call your attention to two new products we've developed for you. The first, our second annual *Woodworking Power Tool Guide,* has all kinds of valuable information for those of you who are in the market for any of the 12 power tool categories covered in it. For more about this helpful product, please turn to page 85.

The second offering, the *WOOD® Shop Apron,* is something I've been wanting to produce for a long time. The staff and I designed it from scratch (down to the type of fabric used and the placement and the stitching of the pockets), and I'm pleased with the results. I think you will be, too. If you're interested, see the ad on page 77.

I've gotta go—see you next time.

Print this article

Larry Clayton

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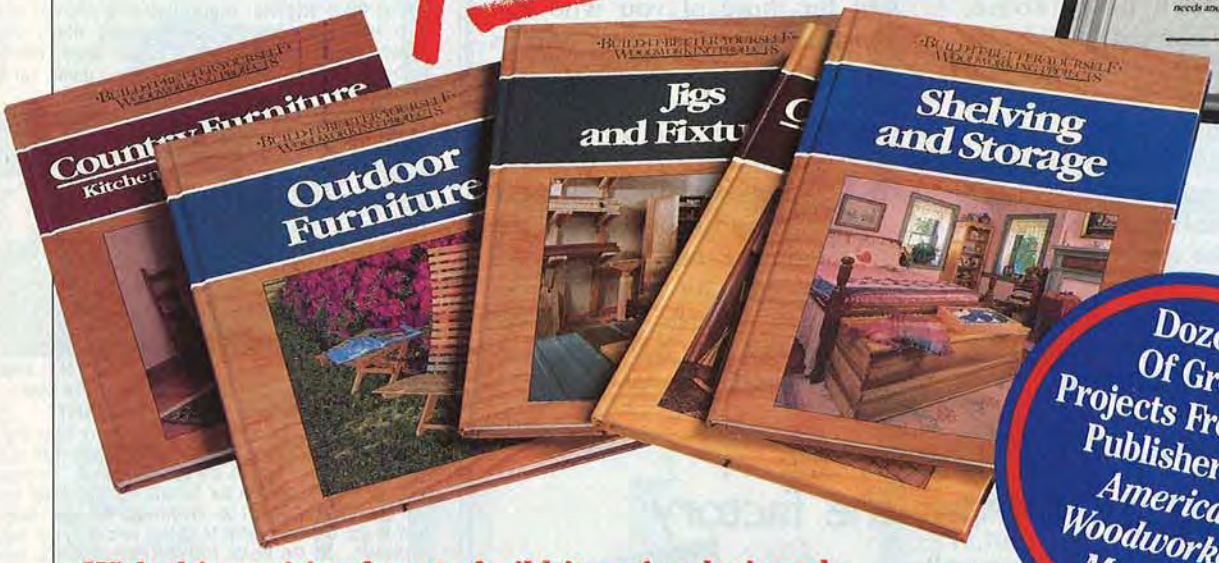

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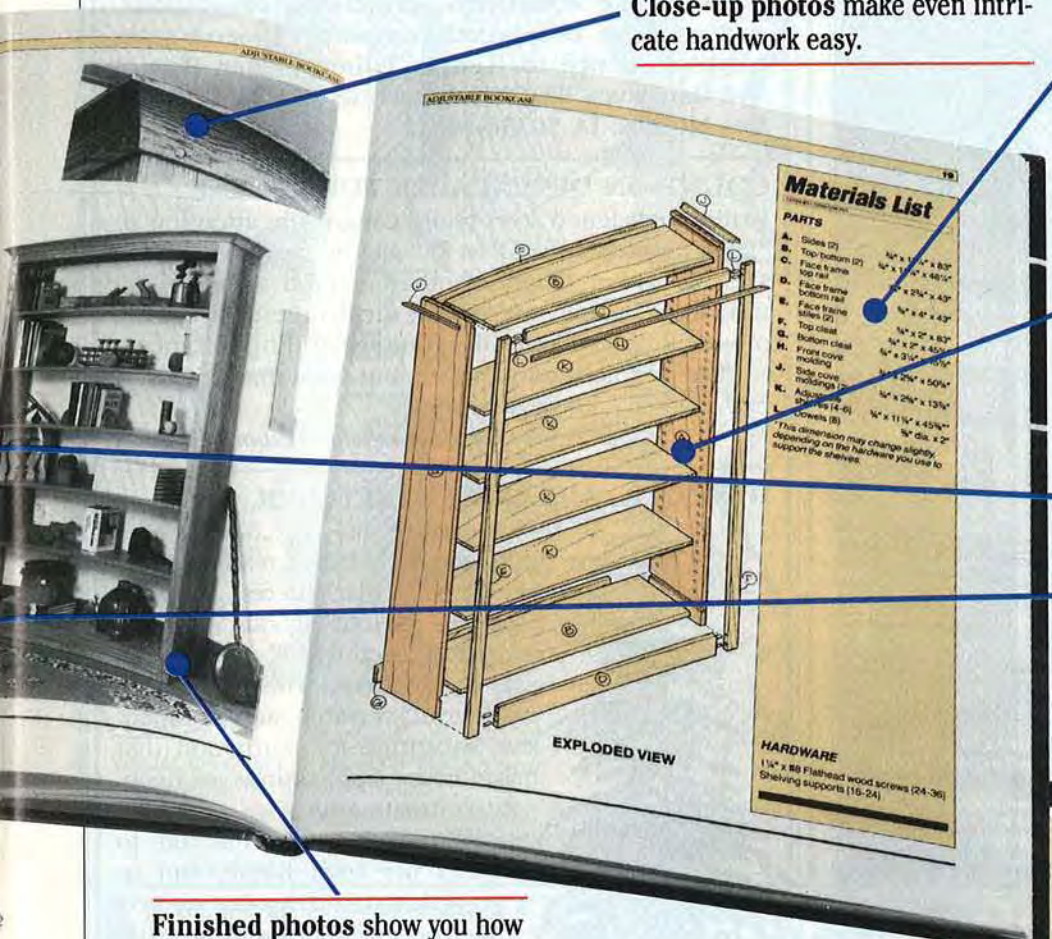

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TALKING BACK

We welcome comments, criticisms, suggestions, and even an occasional compliment. Send your correspondence to: Letters Editor, Better Homes and Gardens® *WOOD*® Magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

COUNT ON DEPENDABLE TURPENTINE

Drilling hardened steel really caught my attention in "Drill Press Heroics, Part II," in the August 1989 issue. My father taught another method a long, long time ago. He told me to use turpentine as a cutting oil—drill bits will cut like your are drilling soft metal.

I can't explain why it does, but from many years of experience, I know it works!

—Chuck Satterfield, Washington, Iowa

HEMLOCK, A BUDGET STRETCHER

WOOD magazine has virtually become my bible, generally being read cover to cover. Of particular interest are your articles on various woods, such as your article in the December 1988 issue on hemlock. This wood is a wonderful, versatile, and inexpensive substitute for hardwood that has effective applications for decorative treatments.

I recently took time off to build my own home, and in traditional northwest style, I used lots of interior wood trim. After I realized that red oak was causing budget problems, I blended red oak and hemlock successfully. The stain and finish are identical except for one important step: Seal before staining hemlock.

—Wayne W. Morris, Clinton, Wash.

KUDOS ON WORLD'S WOODS

We wish to compliment you on Pete Stephano's excellent reporting job in the article "What's Happening to the World's Woods?" This topic is extremely complex and technical, yet the article outlined the major points with great clarity.

Although the hobby woodworker ultimately uses very little lumber as a percentage of the total market, the impact of both overseas and domestic lumber supplies will be felt in years to come.

—James J. Heusinger, The Berea HardWoods, Berea, Ohio

Thanks, Jim. As an imported-wood dealer, you know firsthand the interwoven social and economic issues regarding the world's timber. Our responsibility was to shed some light on the topic.

Continued on page 12

Print this article

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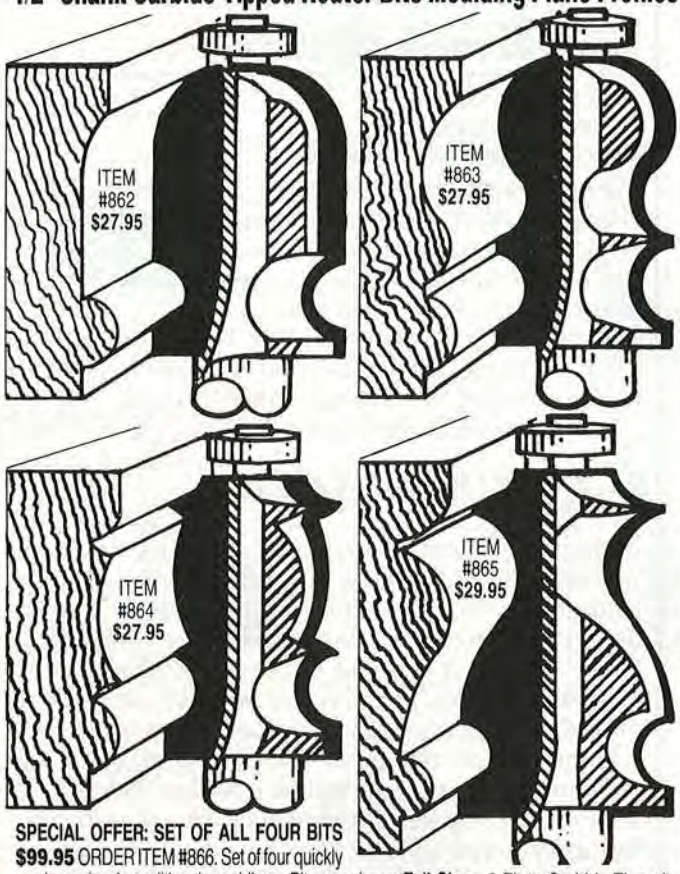

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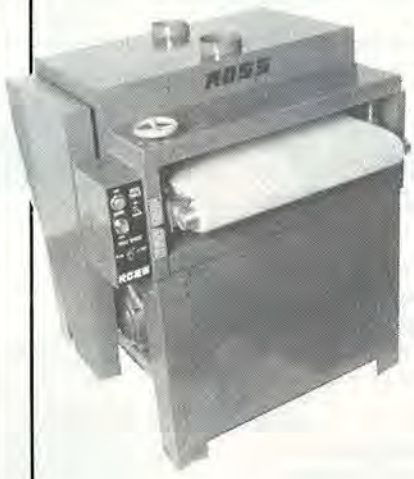

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TALKING BACK

Continued from page 10

CONCERN NO. 5: PRESERVATION GROUPS

I enjoyed your article on "What's Happening to the World's Wood?" in the October 1989 issue until I saw your sources for more information. Several of those sources, in particular, The Environmental Defense Fund and Greenpeace, should have been listed under Concern No. 5: Preservation Groups.

The #1 threat to the supply of timber in the United States is preservation groups. They are currently using the northern spotted owl issue as a "threatened species" to halt logging activities in many federal lands in the Pacific Northwest. Already this cause has driven up prices and closed mills. The issue is not about wildlife, it is about public-forest management.

Preservationists, as the name implies, want all logging activities stopped and the forests preserved without outside influences. They use propaganda and emotional ploys to sway public opinion. They are determined to stop logging and they are using the Endangered Species Act to do it—and they're succeeding! They are supporting legislation introduced by Rep. John Bryant (D-Texas) which would broadly prohibit clear-cutting and other "intensive cutting methods" on National Forest lands. This could mean the end of the forest products industry.

There is an enormous difference between the deforestation and clearing of the tropical rain forests, and clear-cutting and reforestation of our forests here.

The forest products industry spends an enormous effort rejuvenating the forests to ensure a constant supply of timber. You see, they are also in the business of growing trees!

Our forefathers were wise enough to set aside our national forests originally to ensure that our country had a healthy supply of timber. It is a resource we cannot afford to ignore and now must fight to utilize. Forest product industries are truly fighting for their lives, and it amazes me that a magazine called *WOOD* seems to be unaware.

—Mary Wirth, Kane, Penn.

Editor's Note: Mary Wirth lives in the heart of Pennsylvania's cherry timber where her husband, Jonathan, works as a forester for Kane Hardwoods. (See the cherry article in the February 1989 issue.) Her example of the northern spotted owl refers to lawsuits to list the bird as a threatened or endangered species. Environmental litigation and appeals about the spotted owl have tied up nearly a billion board feet of federal timber in western Oregon alone. We're aware of this and similar issues, but feel these well-warranted concerns deserve a separate article.

Continued on page 14

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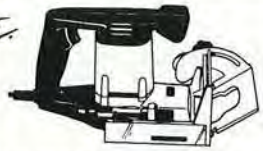

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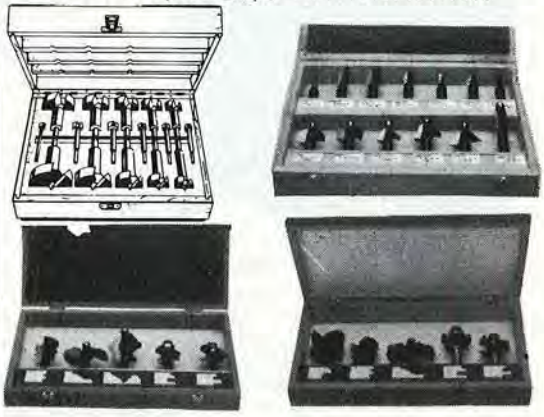

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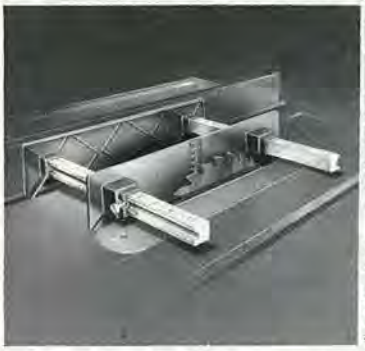

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PARAGAUGE accurately sets table saws, radial arm saws, band saws, drill presses and router tables by providing *perfectly parallel measurements* up to 10 inches in width.

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Each PARAGAUGE is sold with a no-risk 30 day money back guarantee.

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FREE FACTS

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TALKING BACK

Continued from page 12

THE TAMBOUR PART THAT GOT SHELVED

Due to a typesetting error, we omitted the Bill of Materials dimensions for the drawer shelf (X) for the tambour-topped writing desk featured in the December 1989 issue. The ¾"-thick shelf measures 5½" wide by 41½" long.

PROUD TO BE AMERICAN MADE

It was with interest I read "Buying U.S. Isn't As Easy As in the Past" in the October 1989 issue. You are correct on how difficult it is to buy tools made only with U.S.-produced parts. It's for that reason I was disappointed that RB Industries wasn't discussed, since several of our tools are 100 percent U.S. made. We take great pride in our tools and proudly display a U.S.-made sticker on them. If someone, including yourself, is interested in U.S.-made tools, give us a call. We'd be happy and proud to discuss our machinery line. With the very limited amount of U.S.-made products, I felt it necessary to point this out to your fine publication.

Phillip G. Zaroor, C.E.O and president, RB Industries, Harrisonville, Mo.

Although RB Industries doesn't fit the description of a complete-line stationary power-tool manufacturer as mentioned in "Tool Industry Insider," they're serious about American-made components. You won't find one foreign-made part on their scrollsaws or planers.

SOME HORROR STORIES END HAPPILY

I read with great interest your article in the October 1989 *WOOD* magazine about Scheppach aiming to serve in the wake of the Tools-To-Go debacle. I believe I was the person that Tools-To-Go "scammed" (if that's a word) the most. On August 15, 1988, I ordered a Scheppach lathe, copier, and 10" planer/jointer from Tools-To-Go over the telephone, sent a certified check, and they promised immediate shipment. I withdrew $3,410 from my retirement savings and sent that amount to them. As hard as it may be to believe, they gave me a shipping date and a P.I.E. express number so that I could follow shipment. I never heard from Tools-To-Go again.

Now, the reason for this letter. I contacted the Scheppach people in West Germany and after much correspondence and for my additional $1,122 (their manufacturing costs), they sent me all of the equipment. The Scheppach employees are fine people to work with and the machinery works like a charm. I would wholeheartedly suggest to any woodworking dealer that he stock their line in America.

—Lou Howard, Amityville, N.Y.

Lou, we're glad you perservered.

Continued on page 16

Professional Quality Woodworking Machines At Affordable Prices

ORDER TOLL FREE 1-800-288-7297 Extention 90

Super 15" Scroll Saw

On Sale ... **$119.95**
(Includes $52 ***FREE*** Accessories)

Cut intricate wood patterns with this versatile machine.

FEATURES:

- **Parallel rocker arm cutting system** - eliminates blade breakage & sanding.
- **E-Z set blade change system** - permanent, easy to use upper arm blade holders.
- **FREE Accessories** - 1 dz blades, extra blade holders, E-Z set system, Plastic lettering guide set .. $ 52 Value

SPECIFICATIONS:

• Cast iron construction • 15" throat • Motor: 1/8 HP, TEFC, 1650 RPM, 110V, UL Listed • 3/4" stroke • 2" depth of cut • Table tilts to 45º • 43 Lbs.

Item #SAW .....$119.95 (UPS $10)

Scroll Saw Accessories

Dust Blower

Installs between lower arm and base - keeps your pattern line visible at all times. Installation instructions included.
#BKT .... $15.00/Kit (•)

Saw Stand *(On Sale)*

Suitable for Super 15" Scroll Saw or #S46 Sander. 37" High - perfect height & a great convenience.
#STD ... (Reg $39)
On Sale **.. $26**

(UPS $4.00)

Neptune 1-1/2" Lettering Guides

(**Free** w/purchase of Saw). Includes upper & lower case alphabet + numbers + free patterns. **#LN1** ..... **$12**/set (•)

"E-Z Set" Blade Holder System

(**Free** w/purchase of Saw). Clamps any blade (to "000" size) easily into these pivoting blade holders mounted permanently on saw arms. **Simplifies re-attaching blades** when making internal cuts. Simple installation.
Item **#RET** .....**$15**/kit (•)

Magnifier Lamp

Great for magnifying scroll work or closeup work of any kind.

•175% mag
•39" flex arm
• UL approved
• 60 Watts Incandescent

Item **#SML** ..... **$29.95** (UPS $3)

Scroll Saw Blades (5")

#BPK - 4dz asst. (2dz Pin, 2dz #9)...**$14**(•)
#BPS - 2dz Spiral blades (size #2)...**$10**(•)

Super 125 Planer

On Sale $349.95

This machine will pay for itself time and again by planing your own wood. Finishes wood like machines many times its price.

FEATURES:

• **Portable** at 65 lbs • **Power feed** •12 1/2" wide High Speed Steel Knives Shipped assembled and ready to run.

SPECIFICATIONS:

Motor: 16Amp, 115V, 8000RPM, 2HP• 26.2 fpm auto feed rate • 16,000 Cuts/min • Thickness of stock: 3/16" - 6" • 3/16" Max depth of cut • 2 HSS knives

Item #PLA ..... $349.95 (UPS $15)

Planer Accessories

Free plans for roller stand with purchase of rollers

Extra Set of 2 Knives

High Speed steel, 12-1/2" long.
Item #PKN .....$25.00/set (•)

Dust Chute

For vacuum takeoff of wood chips.
#PDS ..(reg $24), **On Sale....$15** (UPS $3)

Planer Stand (Heavy duty)

Drilled for Super 125 Planer. 27-1/4"High.
#PST ...(Reg $44), **On Sale...$39/ea** (UPS $6)

Roller Stand

HTC brand support stand w/heavy duty ball bearing roller. Height adjusts from 25" - 44".
#PRS ...(reg $40), **On Sale** ...**$35** (UPS $4)

Ball Bearing Rollers

(Minimum purchase 2 rollers). Build a roller stand, infeed/outfeed table etc. with these 13" X 2" Heavy Duty rollers. Purchase includes **FREE** plans for roller stand shown above.
Item **#BBR** ..... **$6.50/ea** ($3 UPS /order)

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We unconditionally guarantee your satisfaction with our fine machines. All of our machines carry a Thirty day Money Back Guarantee and One year Warranty for Parts and Labor

Wood Lathe XL- 40

Reg $299.95 ... **On Sale $249.95** (UPS $20)
Includes ***FREE*** 8 piece Wood Chisel Set ... **$34 Value**

Our new XL-40 Wood Lathe surpasses every lathe in its price range with quality & features you would expect from machines many times its price.

FEATURES:

Heavy Duty cast iron construction provides smooth turning action • **40" Centers • 16" Swing** for turning larger bowls • Smooth toolrest movement on 1" solid steel rails • **"Live" center** on tailstock • **Motor mounted for easy positioning** and belt changes • **Sturdy 52" steel base** mounts on table top or optional stand.

PURCHASE INCLUDES:

• Lathe with Motor & Base • Toolrest • 6" Faceplate • 8 pc wood turning chisel set

SPECIFICATIONS:

• MOTOR: 1720 RPM, 1/2HP, 8AMP, 110V • 3 SPEEDS: 660, 1500, 2850 RPM • Overall length - 60" • Weight - 100lbs

Item **# L40** .....***On Sale*** **$249.95** (UPS $20)

Lathe Accessories

XL-40 Lathe Stand

Heavy duty. Wt. 25Lbs
Size: 28"H X 56"L X 21" W
Item **#LST** ..... **$59/ea** (UPS $6)

4 Jaw Wood Chuck

This 6" chuck has 4 independent jaws for holding odd or square shaped work. Jaws can be reversed for inside chucking.
#L4J ..**$49** (•)

8 Piece Wood Chisel Set

(***FREE*** **w/purchase of XL-40 Lathe).** Forged from high carbon steel. Includes 3 gouges, 2 skews, 1 round nose. 1 parting tool and 1 spearpoint.
#LCS ...$34 /set (•)

Two way 4"x6" Sander

On Sale ... **$109.95** (UPS $8)
(Includes **$10 FREE** Belts & Discs)

Item #S46

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FEATURES & SPECIFICATIONS

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DC-1 Dust Collector

(Includes $15 ***FREE*** Hose & Fittings)
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(UPS $20)

Item# **DC1**

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SPECIFICATIONS:

1HP • 110/220V (pre-wired 110V) • 610 CFM air flow • 2ea 20 gal bags • 4" inlet • Castors on base • WT - 75 lbs

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3 IN 1 SHOP HELPER

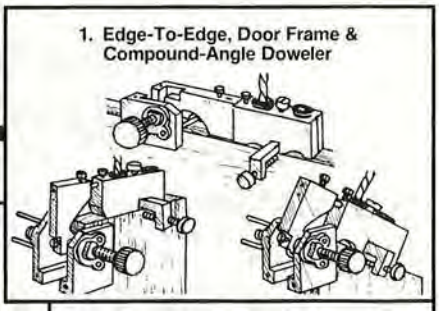
This great-idea tool does so many different jobs around the workshop, we call it our **3-in-1 Shop Helper!** (Maybe 4- or 5-in-1?) You'll call it "very useful!"

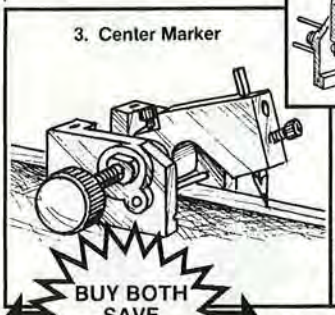
#1. It's a doweling jig that lets you drill edge-to-edge, on board ends (instead of a tenon), on angled boards up to 35°, even compound-angle boards. Puts 2 holes on boards as narrow as 2"; great for raised panels on doors.

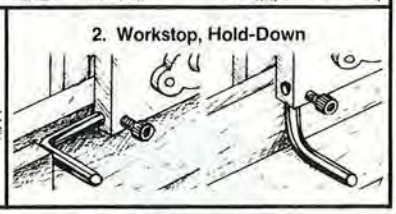
#2. It's a stop you can clamp to your table saw, radial saw, router table, drill press or a fence, so you'll cut or rout faster and with greater accuracy. The L-shaped steel rod also works as a hold-down to keep workpiece in place.

#3. It's a center marker that marks a center line on any board edge up to 2½" thick.

Built to last! Precision machine die-cast aluminum with 3 hardened steel quick-change bushings (1/4", 5/16", 3/8"). Adjustable bar stabilizes jig as you drill edge-to-edge dowel holes. Now ... only $29.99!







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TALKING BACK

Continued from page 14

COMING SOON: INCREASED COVERAGE OF WOOD SPECIES

WOOD magazine has been a source of enjoyment and information to me. I am most impressed with your ability to present information without appearing to assume the great guru image.

Two features of *WOOD* magazine that I look forward to are "Wood Anecdote" and "Wood Profile." A logical spin-off of these two features might be a book, WOOD *Magazine's Encyclopedia of Woods.*

A compendium of wood certainly would be of great value. Inasmuch as I work with wood, I sometimes find myself at a loss concerning some exotic wood properties and applications.

—Bert Wishart, North Bend, Wash.

Bert, thanks for your comments. Many other readers share your interest in wood species. So, we may follow up on your suggestion. In fact, beginning with the April 1990 issue, we will expand the coverage of the "Wood Profile" to two pages to supply you with even more information on the working properties of each featured species. We'll go into more detail about glueability, strength, stability, and so forth.

In the meantime, you may want to obtain a copy of World Woods in Color, *a 1986 Macmillan Publishing release by William A. Lincoln. The book sells for about $40 and includes more than 300 color photos, plus descriptions.*

LATHE BUILDERS: CHECK THIS UPDATED PRICE LIST

If you're still contemplating building our back-to-the basics lathe that appeared in the April 1987 issue of *WOOD* magazine, our supplier has updated prices. The kit includes a headstock and tailstock spindle ($35 each), a pair of 1" flange bearings with locking collars ($65 for the pair), 1" 4-step pulley or sheave ($24), ⅝" 4-step pulley or sheave ($17), and 60" cogged belt ($12). The headstock spindle accepts most Delta/Rockwell faceplates and drive centers. Add $6.50 for shipping and handling per order. Or, order the entire kit for $184 ppd. from North West Carving Supplies, P.O. Box 407, Manhattan, MT 59741. Phone 406/284-3201 to order. For a copy of the lathe article, please send $2 to Lathe Plans, *WOOD* Magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

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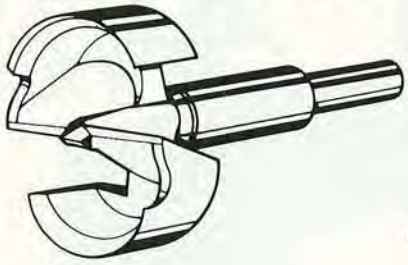

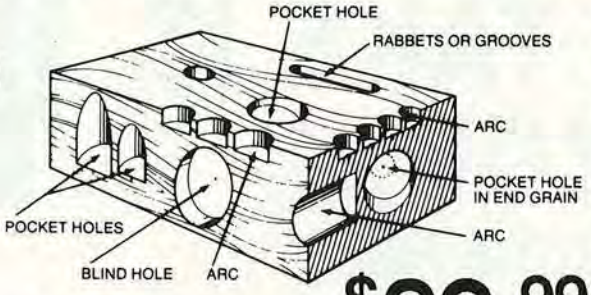

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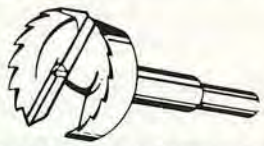

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AP200A $1175 Econ.
AP200 $1685 H.D.

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JT 860 $685 H.D.

2HP, 9"x68" extra long bed, 3 blades, 2 v-belt drive, ½"x8" cut, 36" fence, 4500 RPM, precision lead screw, built-in chip chute, 500 lbs.

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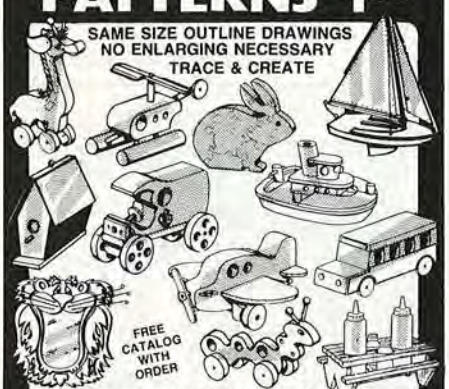

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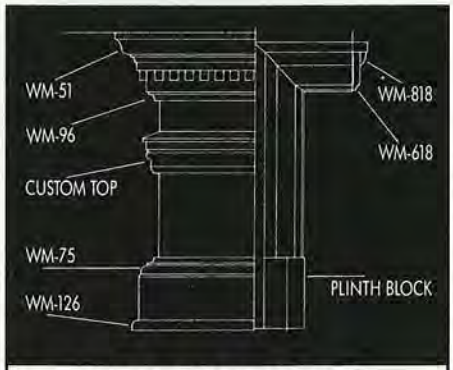

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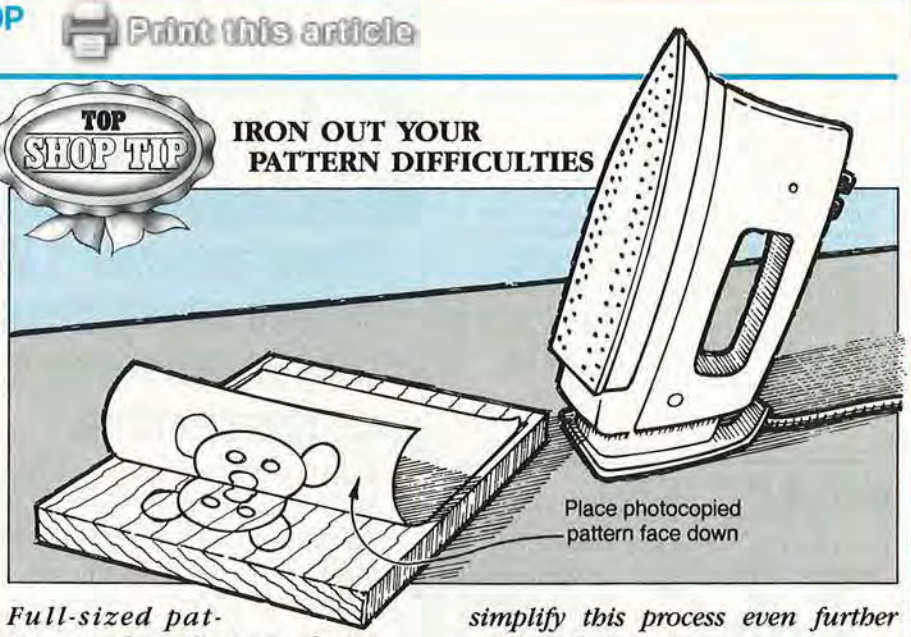
TOP SHOP TIP

IRON OUT YOUR PATTERN DIFFICULTIES



Full-sized patterns, such as the ones often found in WOOD *magazine, greatly simplify transferring those patterns to workpieces. However, you still need to either trace the pattern onto the wood surface using carbon paper, or adhere the pattern with spray adhesive. You can simplify this process even further with a photocopier.*

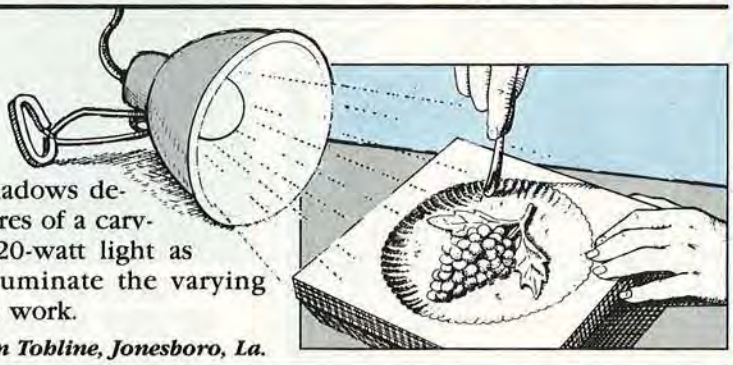
For his tip, Mr. Coyner receives the Dremel model 3950 moto-tool kit shown at *right.*

TIP: Photocopy the pattern, lay the copy facedown on the workpiece, and transfer the pattern with a clothes iron. Set the iron to the low setting, and run the iron over the pattern. Then, slowly peel up sections of the copy to make sure all the lines transferred. If not, just go over them again. Note: the pattern will be reversed, so this procedure won't work for all designs.

—M.B. Coyner, Solvang, Calif.

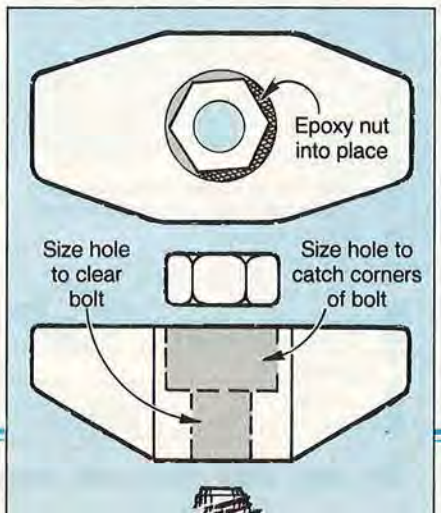
CARVE BETTER WITH SIDELIGHTING

There's nothing like a sunny window for illuminating workpieces such as carvings. However, many of us have to settle for artificial, overhead lighting. This sort of flat lighting makes it hard to distinguish the various planes in a relief carving project.



TIP: Since shadows define the features of a carving, use a 120-watt light as shown to illuminate the varying depths of the work.

—Rev. Dr. Dan Tobline, Jonesboro, La.



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TIP: Combine a hexagonal nut and a scrap of wood to make an oversized wing nut as shown. Bore the upper hole slightly smaller than the corner-to-corner diameter of the nut and drill the lower hole for the bolt 1/64" larger than the bolt's diameter. Apply epoxy glue to the walls of the nut hole and press or tap the nut into place. This technique also works well on bolt heads.

—Paul F. Cook, Westfield, N.Y.

Continued on page 22

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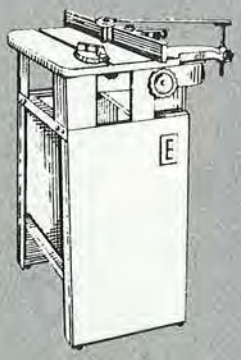

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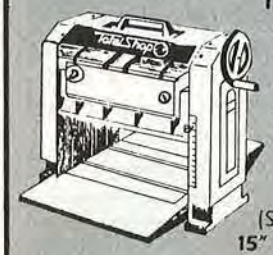

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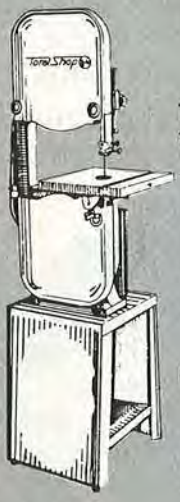

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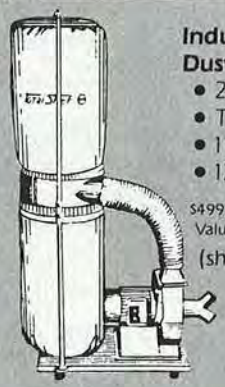

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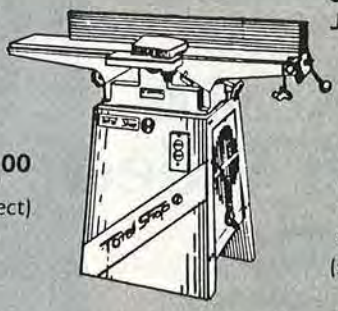

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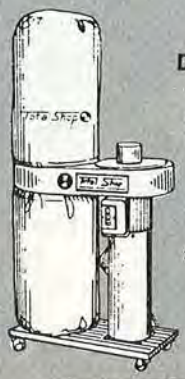

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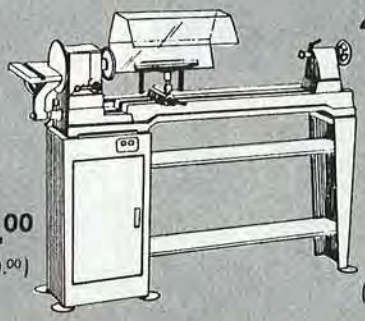

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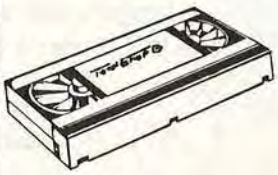

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Continued from page 20

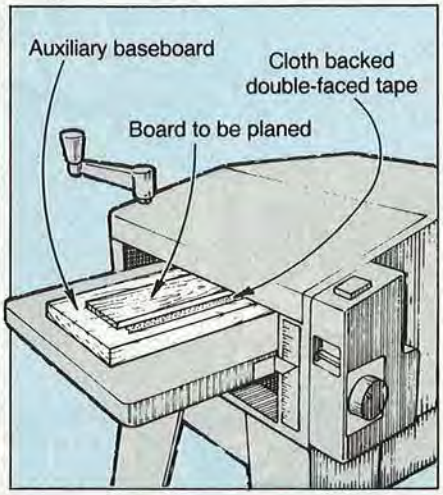
SAFELY PLANING STOCK TO THIN DIMENSIONS

Attempting to run thin pieces of stock—less than ½" thick—through a self-feed planer often fails because the stock breaks up as it passes under the blades. This creates problems when you prepare materials for inlaying or edge-facing work.

TIP: Select a flat auxiliary board at least as wide and 1" longer than the thin stock. Pass the auxiliary board through the planer to make it a uniform thickness.

Then, put cloth-backed double-faced tape between the finished side of the workpiece and the thin stock. Press this assembly firmly together in a bench vise for good adhesion. With this technique, you can plane stock down to 1/16" or less. Remember to always plane with the grain of thin pieces to avoid tearout. If possible, slow the feed rate as well. Be sure to let one end of the stock exceed the tape's length by ½" so you can insert a putty knife to gently pry it off the board easily. If the piece resists prying, dissolve the tape adhesive with lacquer thinner.

—W.M. Fox, DeBary, Fla.



A HACKSAW BLADE CAN HELP YOU DRAW CURVES

Occasionally you have to draw a curved line but have no template or guide to create a smooth, pleasing arc. You can buy such templates at art supply stores, but at a premium price.

TIP: You can make an instant template by bowing a hacksaw blade to the curvature you need and holding it in place with a length of masking tape. As a guide for drawing larger or more complicated curves, use a bandsaw blade.

—Marvin O. Gennrich, Austin, Minn.

Continued on page 24

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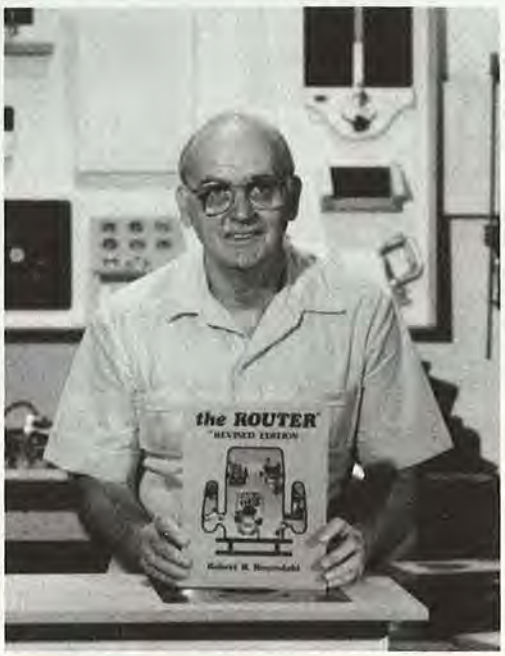

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 22

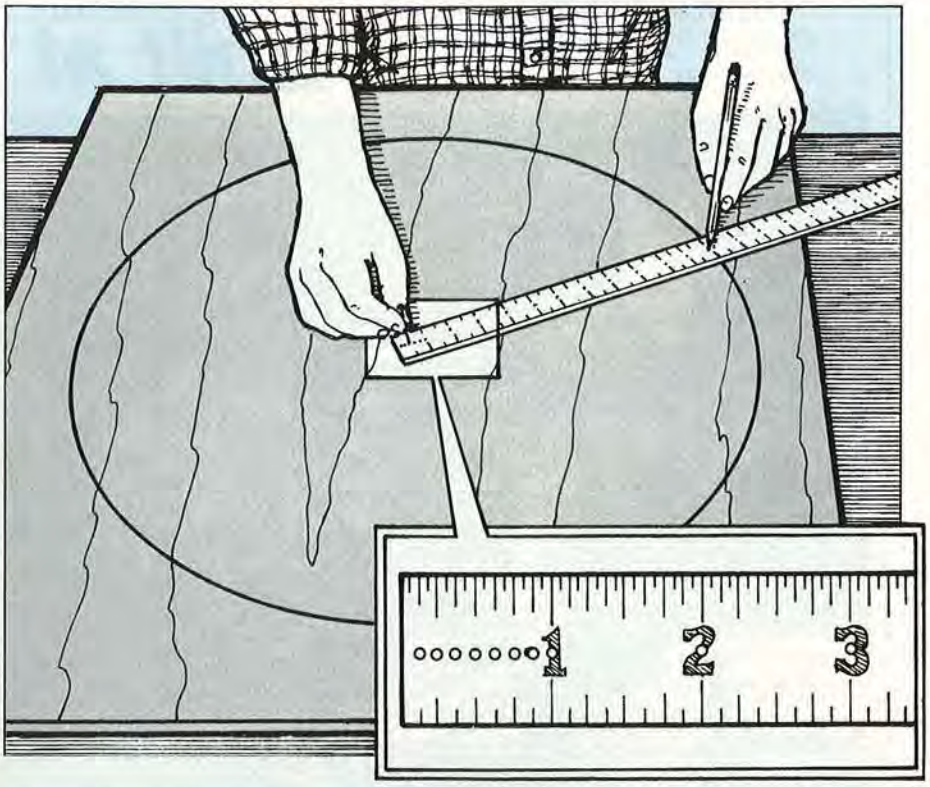
TURN A YARDSTICK INTO A LARGE-CIRCLE COMPASS

Attempting to draw large circles perfectly with a length of string can transform the coolest worker into a muttering grump.

TIP: For a trusty compass that makes it easy to draw circles of many sizes, drill 5⁄64″ holes at every 1⁄8″ mark in the first inch of a metal yardstick. Now, drill 5⁄64″ holes at every inch mark on the rest of the yardstick's length. This also works fine in a wooden yardstick. Just space the holes 1⁄4″ apart in the first inch for strength.

To draw a circle with a 27¾″ radius, for example, tap a 19- or 20-gauge brad through the hole at the 1⁄4″ mark. Next, insert the point of a pencil in the 28″ hole (28″-1⁄4″=27¾″) and draw your circle.

—Walter S. Thomas, Jr., Drexel Hill, Pa.



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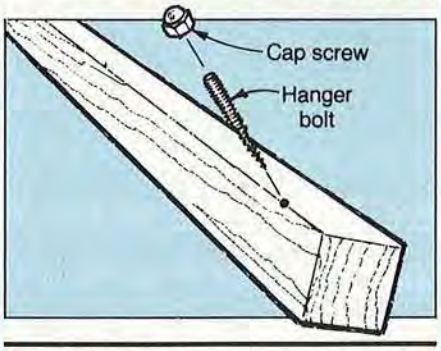
EASY WAY TO INSTALL HANGER BOLTS

Hanger bolts—those odd-looking fasteners that have wood-screw threads at one end and standard-bolt threads at the other end—can be a real challenge to install. You could turn a regular nut all the way down on the standard threaded end so you can use a wrench to drive it in. But, the nut may bind so you can't remove it without backing the hangar bolt out of the wood. There has to be a better way!

TIP: Place a cap screw on the bolt end as shown *below*, and use a wrench to install the tapered end into a pilot hole. When done, a little reverse pressure should loosen the cap screw for removal.

—John White, Indianapolis, Ind.

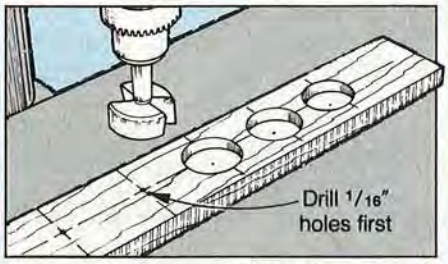


BULL'S-EYE ALIGNMENT FOR LARGE-DIAMETER HOLES

Centering a Forstner bit can be difficult because the shape of the cutting head prevents you from seeing its point and your layout lines.

TIP: Drill a 1/16" guide hole at the centerpoint of each hole. Ease the tip of the bit into the guide hole and take care to keep it in place as you turn on the drill press.

—From the WOOD magazine shop



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#491		1½" Classical		1½"	¾"	¼"	$25.00
#792		1½" Classical		1½"	⅞"	½"	$25.00
#231		5/32" **Roman Ogee**	5/32" R	1¼"	15/32"	¼"	$17.00
#232		¼" Roman Ogee	¼" R	1½"	¾"	¼"	$18.00
#661		¼" Roman Ogee	¼" R	1½"	¾"	½"	$21.00
#340		⅛" **Cove**	⅛" R	⅝"	½"	¼"	$12.00
#341		¼" Cove	¼" R	1"	½"	¼"	$13.00
#342		⅜" Cove	⅜" R	1¼"	9/16"	¼"	$14.00
#343		½" Cove	½" R	1½"	⅝"	¼"	$15.00
#644		¾" Cove	¾" R	1⅞"	¾"	½"	$28.00
#350		⅛" **Round Over**	⅛" R	¾"	½"	¼"	$11.00
#351		3/16" Round Over	3/16" R	⅞"	½"	¼"	$11.00
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#354		⅜" Round Over	⅜" R	1¼"	⅝"	¼"	$15.50
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#405		½" Dovetail	14 degree	½"	½"	¼"	$ 8.50
#409		¾" Dovetail	14 degree	¾"	⅞"	¼"	$10.50
#709		¾" Dovetail	14 degree	¾"	⅞"	½"	$10.50
#402		⅜" Dovetail	8 degree For	⅜"	½"	¼"	$12.00
#404		½" Dovetail	8 degree Leigh	½"	13/16"	¼"	$12.00
#708		1 1/16" Dovetail	8 degree Jigs	1 1/16"	1"	½"	$17.50

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#415		¼" **Core Box**	round nose	¼"	¼"	¼"	$10.00
#416		⅜" Core Box	round nose	⅜"	⅜"	¼"	$11.00
#417		½" Core Box	round nose	½"	1 1/32"	¼"	$14.00
#418		¾" Core Box	round nose	¾"	⅝"	¼"	$15.00
#719		1" Core Box	round nose	1"	¾"	½"	$18.00
#470		¼" **Straight**	plunge cutting	¼"	¾"	¼"	$ 7.00
#471		5/16" Straight	plunge cutting	5/16"	1"	¼"	$ 7.00
#472		⅜" Straight	plunge cutting	⅜"	1"	¼"	$ 7.00
#474		½" Straight	plunge cutting	½"	1"	¼"	$ 7.00
#775		½" Straight	plunge cutting	½"	2"	½"	$14.00
#476		9/16" Straight	plunge cutting	9/16"	1"	¼"	$ 7.00
#478		⅝" Straight	plunge cutting	⅝"	1"	¼"	$ 8.00
#479		¾" Straight	plunge cutting	¾"	1"	¼"	$10.00
#781		1" Straight	plunge cutting	1"	1½"	½"	$12.00
#500		⅜" **Flush**	**Trimming**	⅜"	½"	¼"	$ 7.00
#502		½" Flush	Trimming	½"	½"	¼"	$ 7.50
#503		½" Flush	Trimming	½"	1"	¼"	$ 8.50
#804		½" Flush	Trimming	½"	13/16"	½"	$ 9.00
#545		**Tongue & Groove**	Straight	1⅝"	1"	¼"	$30.00
#845		Tongue & Groove	Straight	1⅝"	1"	½"	$30.00
#546		Tongue & Groove	Wedge	13/16"	1"	¼"	$30.00
#846		Tongue & Groove	Wedge	1⅝"	1"	½"	$30.00
#450		⅛" **Beading**	⅛" R	¾"	½"	¼"	$11.00
#451		3/16" Beading	3/16" R	⅞"	½"	¼"	$11.00
#233		¼" Beading	¼" R	1"	½"	¼"	$13.00
#453		5/16" Beading	5/16" R	1⅛"	½"	¼"	$14.00
#454		⅜" Beading	⅜" R	1¼"	⅝"	¼"	$15.50
#455		½" Beading	½" R	1½"	¾"	¼"	$17.00
#375		**45 degree**	45 degree	⅝"	1½"	¼"	$15.00
#676		**Chamfer**	45 degree	⅞"	1⅞"	½"	$23.00

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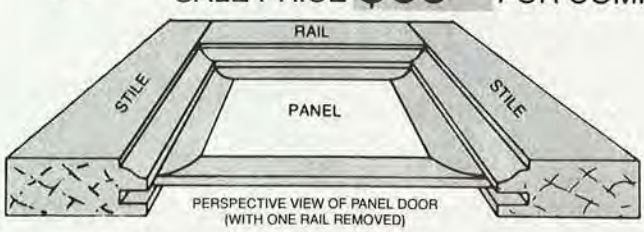

PERSPECTIVE VIEW OF PANEL DOOR (WITH ONE RAIL REMOVED)

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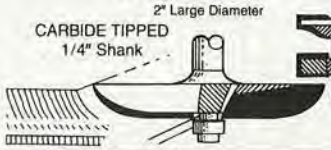

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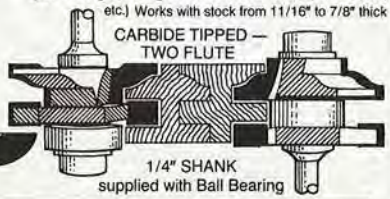

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TIPS FROM YOUR SHOP (AND OURS)

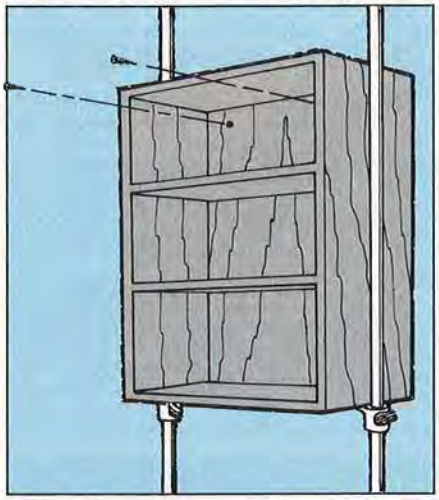
Continued from page 25

WORK SMARTER ALONE

There's usually no getting around it: Some tasks, such as hanging wall-mounted cabinets, simply require at least one helper. Unfortunately, often the work is ready to be mounted but the trusty assistant cannot be found.

TIP: Use long pipe clamps to support the load as you drill the necessary holes and drive the screws.

—From the WOOD magazine shop

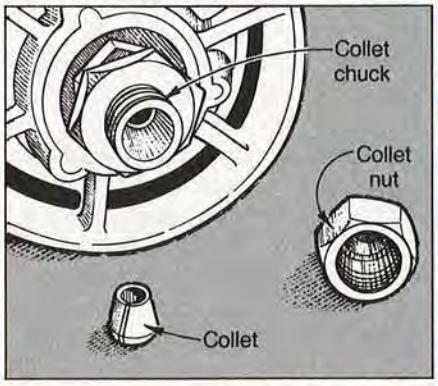


STEEL WOOL WHISKS GRIME FROM ROUTER COLLET

When fine wood dust and other residue collect inside the collet assembly on a router, you'll have to struggle to change bits.

TIP: Use a small wad of fine steel wool to scour out the gummy accumulation. This effectively removes the grime without marring or scratching the metal surface.

—From the WOOD magazine shop



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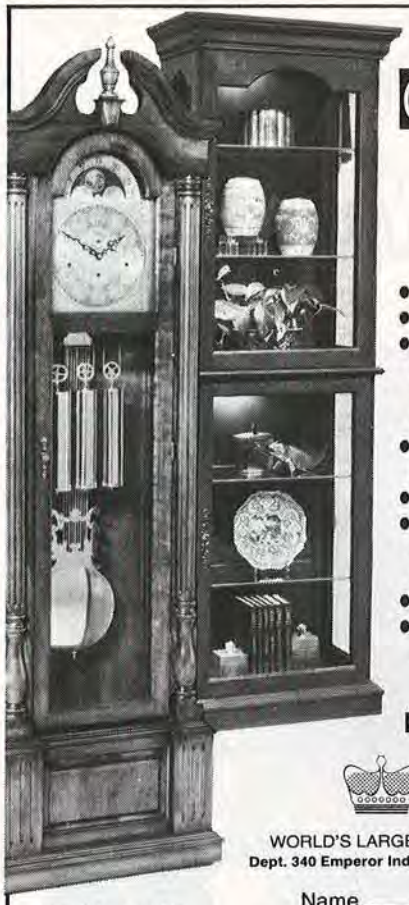

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TIPS FROM YOUR SHOP (AND OURS)

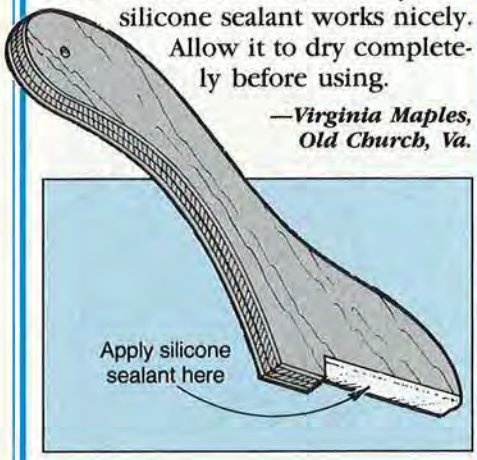
Continued from page 27

HERE'S A "GRIPPING" IDEA FOR PUSH STICKS

When working with stationary power cutting tools such as tablesaws, push sticks make indispensable safety aids. However, unless handled carefully, these devices can slip and cause an accident.

TIP: To make the push stick stay put on the workpiece, apply a nonslip coating to the bottom of the stick as illustrated. A 1/16" layer of silicone sealant works nicely. Allow it to dry completely before using.

—Virginia Maples, Old Church, Va.



MORE TIPS FROM OUR WOODWORKING PROS

You'll find useful shop tips scattered through this issue of *WOOD* magazine:

- If you want to spare yourself the tedious work of removing excess glue along joints, try the masking-tape tip on page 44.
- Turn your microwave into a mini kiln for green wood with the procedure on page 47.
- Even if you already have a router table, and don't plan to build our version, see page 55 for a fence that may greatly improve your current table.
- Here's a way to give your projects a smooth, professional-looking paint job. See page 56.
- Learn an easy steam-bending technique on page 60.
- With the method described on page 62, you can turn a grid pattern into a full-sized pattern.
- Easy and inexpensive toy wheels? You bet! See page 73.

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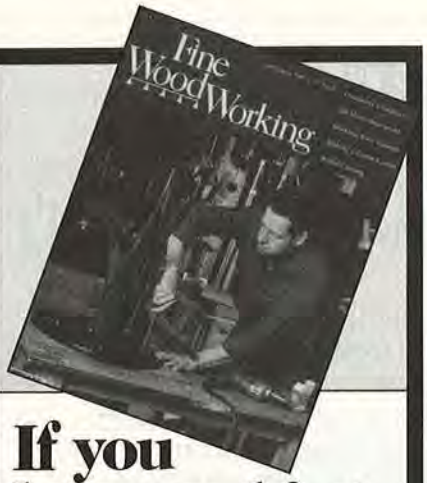

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TOOL INDUSTRY INSIDER

Print this article

COMING TO A HOME CENTER NEAR YOU: COMPUTERS

Hey woodworkers! How would you like to press a few buttons and in less than a minute have a full set of customized instructions and materials for your next finishing/refinishing project? Or, how about designing a deck for your home (complete with a detailed framing plan, three-dimensional rendering, materials list, and building instructions) in several minutes and without lifting a pencil? Thanks to the latest in computer technology, you now can walk into many home centers and perform these feats.

Two companies—Formby's and Weyerhaeuser—have developed in-store computer centers that help you get started on these projects (with their materials, of course). We had an opportunity to try both systems at the National Home Center Show in Chicago, and judging by their ease of use, it's our guess that these companies have started a trend that's sure to spread to other manufacturers.

Formby's has placed nearly 500 "wood-finishing centers" around the country in larger home centers and hardware stores. Homer's system works like this: Depending on your project, the machine asks you two to 10 multiple-choice questions. Based on your answers, the machine prints out a list of supplies and instructions.

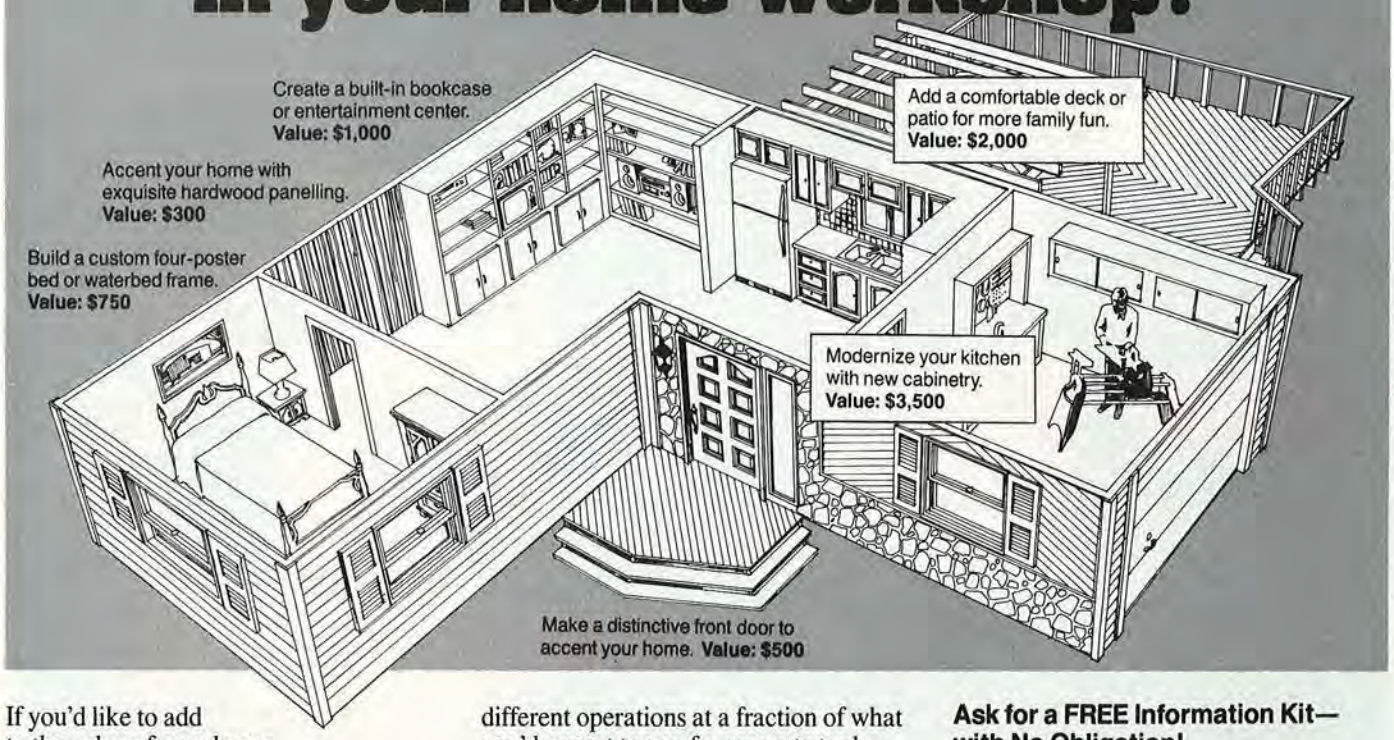
If you'd like to try an even larger project, you can design a deck, detached garage, or shelving/cabinet system on Weyerhaeuser's new Design Center computer (with the help of a trained sales representative and your rough plan). To design a deck, for example, you first obtain a planning kit from a participating store. When you return to the store, it takes just a few seconds to change dimensions, railing types, the number of levels (up to three), stair positions, and other design elements of your deck. The computer tells you exactly what you'll pay for materials. The cost of this planning? Nothing, most likely, but that's up to each store.

Weyerhaeuser is exploring other home-improvement plans but won't say what they have in mind. The company has placed Design Centers in Connecticut, Georgia, Illinois, Indiana, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, Ohio, Rhode Island, Texas, and Wisconsin. Weyerhaeuser expects to expand the program into most other markets.

With the help of a salesperson, you can design a deck, detached garage, or shelving system on a Weyerhaeuser Design Center.

Photo courtesy of Weyerhaeuser Company

Add big value to your home with a small investment in your home workshop!


Create a built-in bookcase or entertainment center. Value: $1,000
Accent your home with exquisite hardwood panelling. Value: $300
Build a custom four-poster bed or waterbed frame. Value: $750
Add a comfortable deck or patio for more family fun. Value: $2,000
Modernize your kitchen with new cabinetry. Value: $3,500
Make a distinctive front door to accent your home. Value: $500

If you'd like to add to the value of your home by doing repairs or remodeling, you really only have three choices:

1. Hire an expensive professional to do the job for you.
2. Buy a workshop full of individual power tools that could cost you thousands.
3. Get your hands on a Shopsmith MARK V—the *affordable* all-in-one home workshop system that replaces the five most needed woodworking tools with a single, compact unit!

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*Suggested consumer price
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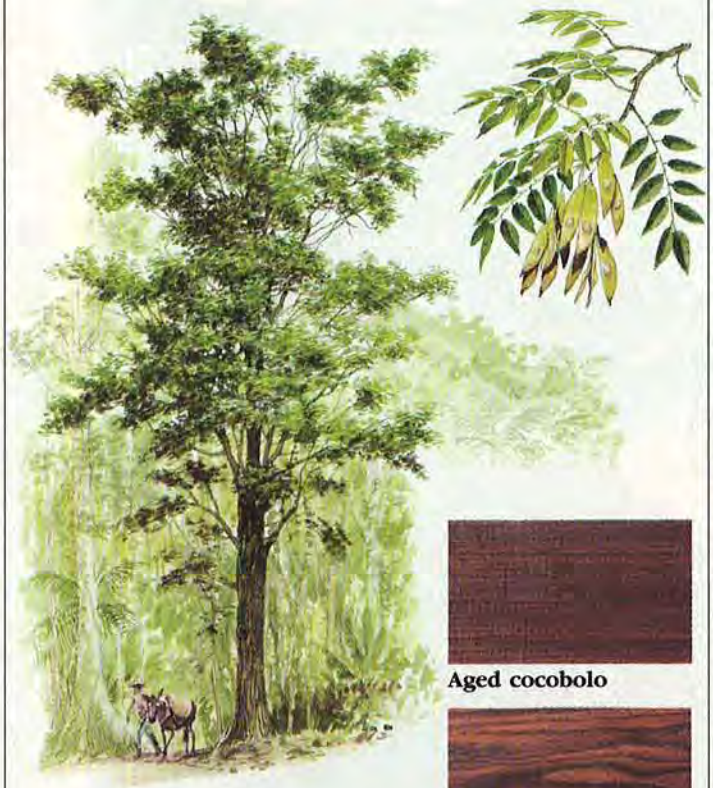
COCOBOLO

The Central American wood that stands up to a dunking

In the days when merchant ships battled the ravages of South America's treacherous Cape Horn, heavy cocobolo commanded precious little cargo space. But, the opening of the Panama Canal in 1912 changed all that. Cocobolo became common deck cargo, and tons poured into New England ports, where manufacturers turned it into handles on the finest cutlery.

Even though merchants had traded cocobolo for more than 100 years, it was decades before botanists agreed on its name. That's because the tree—first discovered in Panama—was classified as rosewood. Later, botanists found other specimens in Costa Rica, Nicaragua, Honduras, El Salvador, Guatemala, and Mexico, and classified each as a different species!

Such scientific disagreement meant little to manufacturers and craftsmen, however. They knew that the wood was heavy, yet machined easily, could take abuse, and its oil protected it from dunkings in the dishwater.



Aged cocobolo

Multicolored cocobolo

Wood identification

Cocobolo (*Dahlbergia retusa*) belongs to the same genus as Brazilian rosewood, and in fact, has similar properties. Rosewood, however, likes South America's rain forests. Cocobolo prefers the drier, upland savanna country of Central America's Pacific coast.

A medium-sized—and quite often poorly formed—cocobolo tree reaches a height of only 75′–80′. Its reddish-brown, scaly trunk measures about 3′ in diameter. Amid the tree's large, leathery leaves, tiny yellow blooms flower, then later turn to long, flat seedpods.

At 65 pounds per cubic foot air dry, cocobolo weighs twice as much as cherry. Not surprisingly, it's too dense to float.

Cocobolo heartwood often carries a sunrise of hues—red, yellow, pink, and black, occasionally streaked with green, purple, and blue. In some boards, a creamy white sapwood borders the colorful heartwood. With age, it darkens.

Working properties

Cocobolo has a bad reputation, but not for its working qualities. This wood is a well-known *sensitizer* that can produce a poison-ivy type rash or other reaction in allergic individuals. If you have an allergy history, work cocobolo with full protection: gloves, long sleeves, a dust mask, and a protective skin cream.

Dense and hard, cocobolo requires power tools or razor-sharp hand tools. With either, however, edges dull quickly. But, you can almost effortlessly bring the wood to a beautiful luster by sanding and polishing.

Although cocobolo grips screws well, gluing poses a problem. Because of oils and silica in the wood, you should wipe all joining surfaces with lacquer thinner or acetone, then glue immediately. And, we give slow-set epoxy the nod over other adhesives.

Turners often apply only a cabinetmaker's wax to cocobolo. Furniture and case goods require a penetrating oil with a wax topcoat. Other finishes provide only mediocre results.

Uses in woodworking

Tradition typecasts cocobolo as handle stock, but it excels in other starring roles as well. Mirrors, musical instruments (except those that touch the lips), jewelry boxes, clock cases, furniture, bowls, and other turnery all suit it. Remember, though, that the wood darkens with age, and without finish protection, turns nearly black.

Cost and availability

Cocobolo isn't a rare wood. You can buy it (at press time) for about $11 per board foot. Retailers of exotic wood and mail-order firms usually sell turning squares and blanks, as well as boards and veneer.

Illustration: Steve Schindler

PERFORM SOME WOODWORKING MAGIC

5 GREAT ROUTER TRICKS

Actually, there's no sleight of hand involved in working with a router—just a few tricks that help you charm more uses from it. For help with this article, we turned to three router wizards—Paul McClure of Denver, Brad Witt of Davenport, Iowa, and *WOOD*® magazine's very own Jim Downing—and asked them to conjure up their best feats of router magic. Although none of them could manage to levitate a router or make it disappear, they did pass along five of the niftiest tips to ever cross our workbench.

PROVEN TECHNIQUES FROM THE SHOP TESTED WOOD MAGAZINE SHOP

Print this article

TEMPLATE HELPS

In his job as *WOOD* magazine's design editor, Jim Downing uses draftsman's templates every day to draw circles in a fraction of the time required with a compass. So one day, Jim reasoned, "Why not design a template for routing circles in wood just as quickly?" A quick trip to the shop proved that Jim's idea made sense. In fact, he even figured out a system for cutting 28 different-sized circles from a template with only 7 holes.

To make a template for routing holes from 2⅝" to 6" in diameter, in ⅛" increments, first lay out the circles' centers where shown in the

MAKE 28 SIZES OF HOLES WITH ONE TEMPLATE

Desired hole size	Template hole	Guide bushing	Bit Size
2⅝	Hole 1 3⅛" diam.	¾	¼
2¾		⅝	¼
2⅞		⅝	⅜
3		⅝	½
3⅛	Hole 2 3⅝" diam.	¾	¼
3¼		⅝	¼
3⅜		⅝	⅜
3½		⅝	½
3⅝	Hole 3 4⅛" diam.	¾	¼
3¾		⅝	¼
3⅞		⅝	⅜
4		⅝	½
4⅛	Hole 4 4⅝" diam.	¾	¼
4¼		⅝	¼
4⅜		⅝	⅜
4½		⅝	½
4⅝	Hole 5 5⅛" diam.	¾	¼
4¾		⅝	¼
4⅞		⅝	⅜
5		⅝	½
5⅛	Hole 6 5⅝" diam.	¾	¼
5¼		⅝	¼
5⅜		⅝	⅜
5½		⅝	½
5⅝	Hole 7 6⅛" diam.	¾	¼
5¾		⅝	¼
5⅞		⅝	⅜
6		⅝	½

MAKE QUICK, SMOOTH CIRCLES

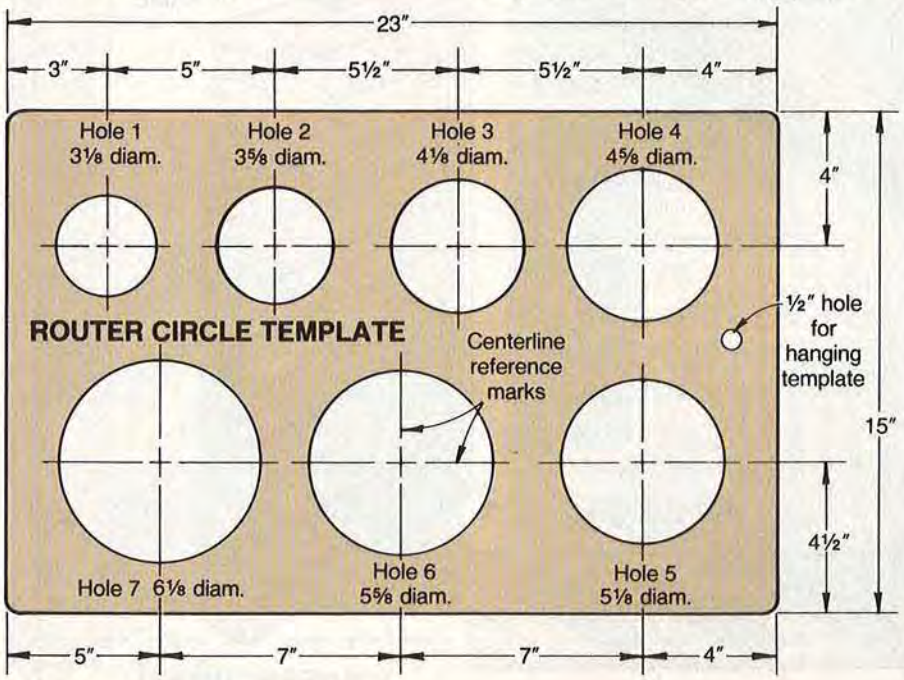
A circle template makes fast work of flat-bottom holes, such as the one *above,* as well as through-holes.

Cut the template holes with a 6″ circle cutter. After cutting each hole to half its depth, flip over the stock and complete the cut to avoid chip-out.

drawing *below* on a 15×23″ piece of ¾″ plywood. Since the size of the seven template holes must be exact, test each cut in scrap stock with a circle cutter before cutting the template holes. The photo at *left* shows cutting the holes in the template. To avoid chip-out on the back side of the template, cut the holes to about half of their depth, flip over the template, place the center bit into its hole, and complete the cut.

With all the holes cut, extend the four centerline marks down the walls of each hole with a try square. These marks help you center the template holes over the layout lines on your workpiece. Now, mark the diameter of each template hole and save a copy of the chart on the previous page. This helpful chart shows what size straight router bit and guide bushing to use for each size hole.

In addition to cutting holes through stock, a router also will cut flat-bottom holes. When doing this, you may find that the base of your router doesn't span some of the larger template holes. When that happens, make a 12″-diameter auxiliary base of ¼″ clear acrylic.



MAKING LOUVERS: IT'S A BREEZE

Beautiful and functional louvers like these are just a router jig away.

If you were to go into Jim Downing's home workshop, you'd see walls covered with jigs. And you would need only to look as far as his pet project to know why. While building a 30-foot sailboat in his garage, Jim has had to fashion one jig after another to help him construct its many wooden components. For instance, he found existing louvered-door construction techniques complicated and time-consuming. The solution? Another jig, of course.

As you can see from the photo *above,* Jim's jig resulted in one lovely louver. To make a similar louvered insert, you'll need a plunge router and the jig we're operating *below*. See the following pages for building instructions.

You can size the louver jig to accept any plunge router.

Continued

Bill of Materials

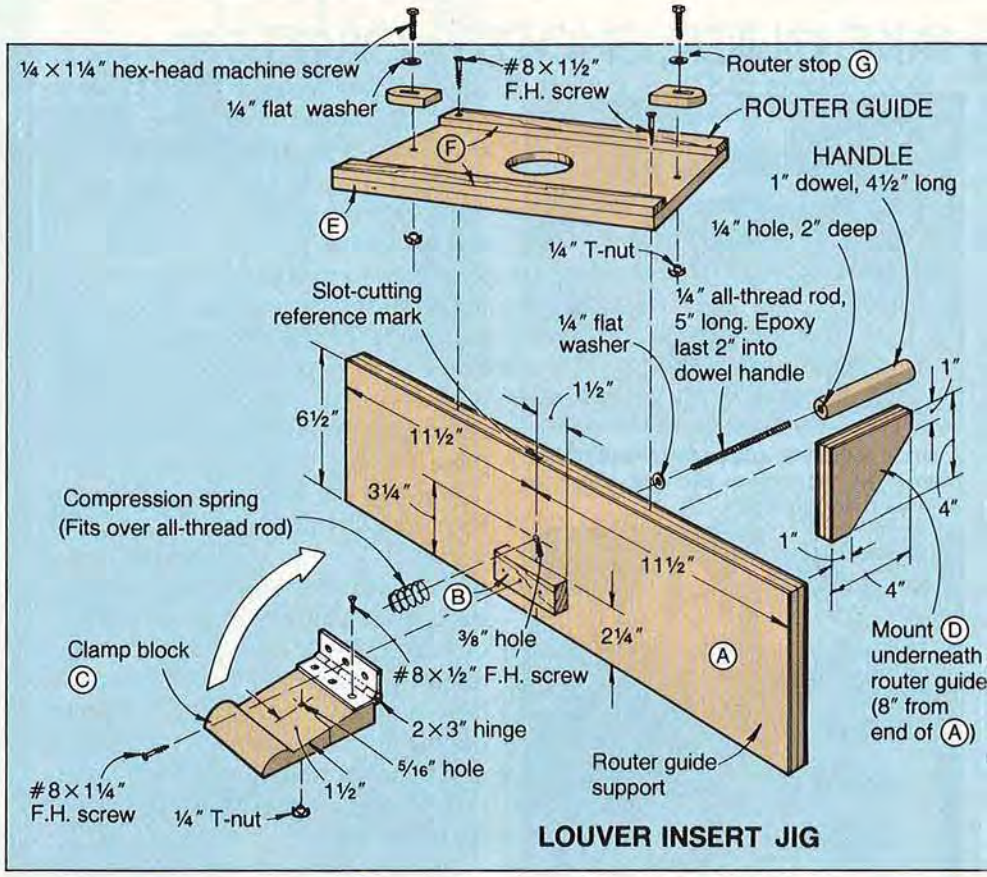
Part	Finished Size			Matl.	Qty.
	T	W	L		
A	¾"	6½"	23"	P	1
B	¾"	1⅛"	3"	H	1
C	¾"	3"	5"	H	1
D	¾"	4"	4"	P	1
E	½"	*	**	H	1
F	½"	1"	**	H	2
G	½"	1"	2¼"	H	2

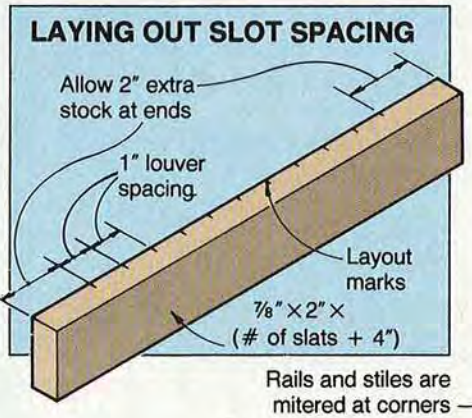
Material key: P-plywood, H-any hardwood.

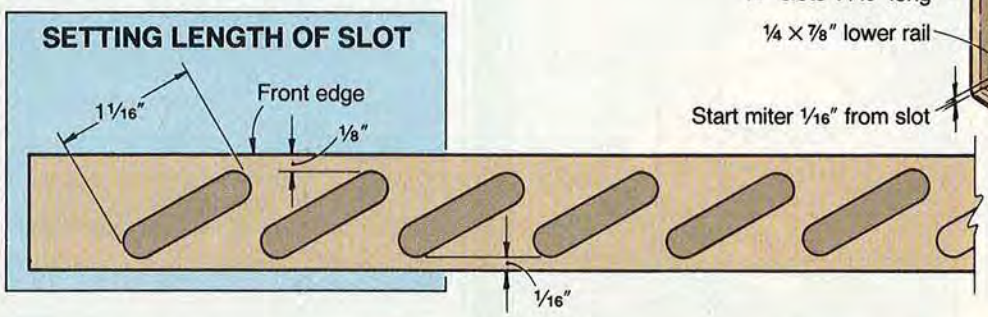
*Width of router base + 2"
**Length of router base + 4¾"

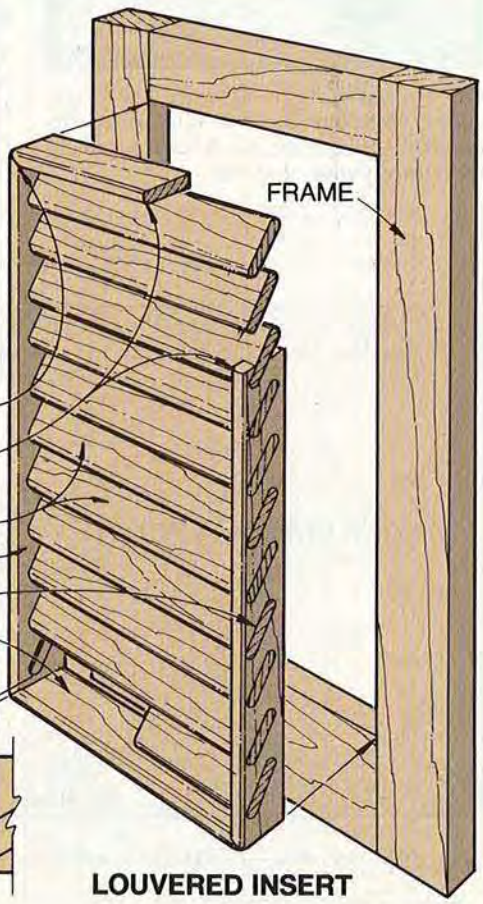
It's a good idea to build the insert first, then make the frame. This way, you make minor adjustments in the size of the frame's opening to fit the insert—a simpler process than building a louvered insert to exact size. Follow these steps to make the insert's stiles and rails:

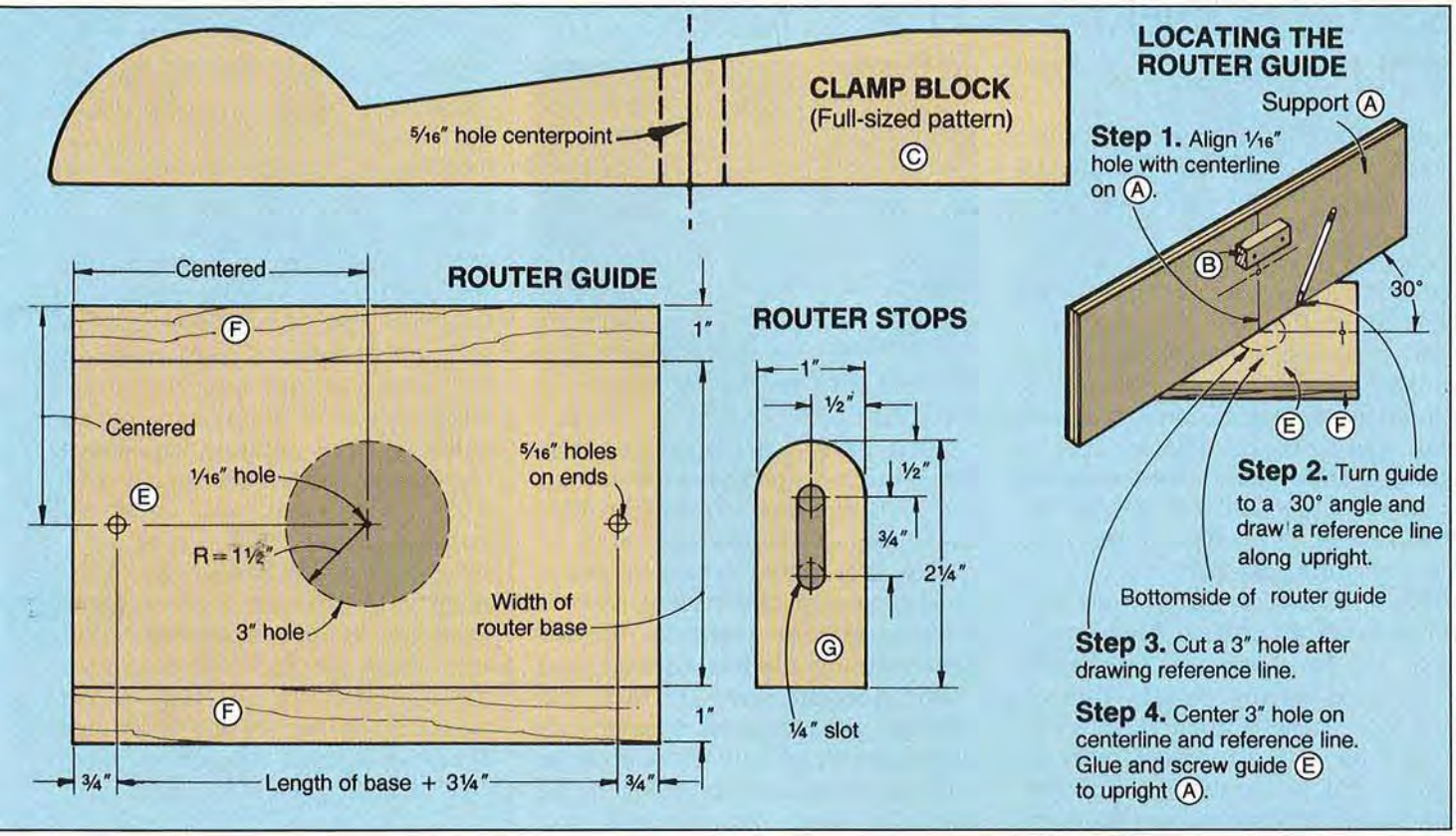
- Plan the number of louvers (each louver takes up 1" of the stile's length).
- Machine a piece of stock that's ⅞" thick, 2" wide, and to length (see the Laying Out Slot Spacing drawing). Then, lay out the spacing of the slots that hold the louvers.
- Clamp a piece of ⅞" scrap stock into the jig by placing the wood between the clamp block and router guide support. Secure the stock by tightening the handle. Now, set the jig's stops (G) for a 1⅛16"-long slot as shown *below*.
- With a straight bit, make an 1¹⁄₁₆"-deep test cut, lowering the bit in ⅛" passes.
- When satisfied with your test cuts, clamp the stile stock into the








FRAME
Rails and stiles are mitered at corners
⅛" round-over on inside and outside edges
¼ × 1" louvers
¼ × ⅞" slotted stile
¼" slots 1¹⁄₁₆" long
¼ × ⅞" lower rail
Start miter 1⁄16" from slot
LOUVERED INSERT

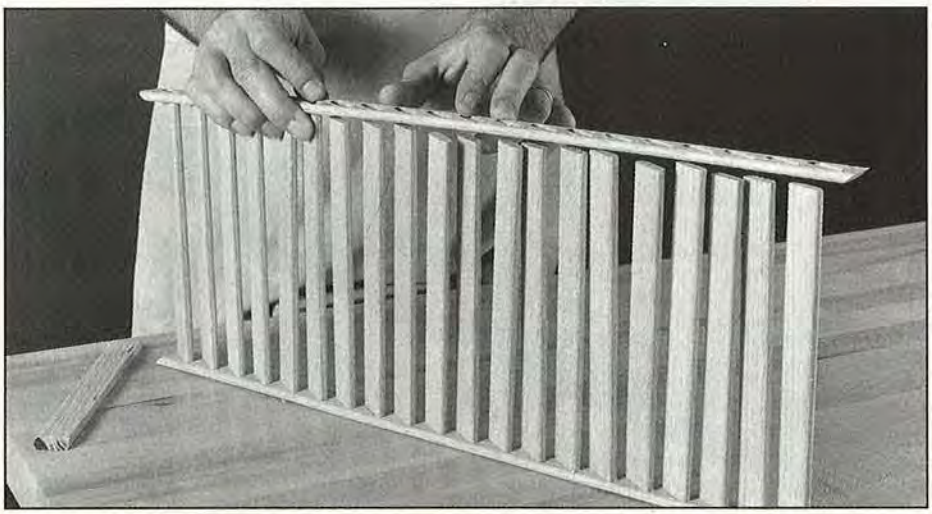


jig, aligning the first louver mark with the jig's reference mark. Cut a slot at each louver mark.

- With the slot-side of the stock facing the fence, rip the stock into two ¼"-thick stiles as shown *below*.
- From the leftover stock, rip the ¼"-thick rails.
- With a ⅛" rounding-over bit, shape the inside and outside front edges of the rails and stiles. Leave the back edges square.
- Miter the rails and stiles (start the stile miters 1/16" from the top and bottom slots).

To make the louvers, first rip a ¼"-thick test strip from a piece of 1"-thick stock. Round over all four edges of the strip with a ⅛" rounding-over bit and check its fit into the louver slots. Adjust your tablesaw and router until the test strip fits in the slots. Now, cut the louver stock to lengths 1/16" shorter than the rails and assemble the louvers and stiles as shown *below*. Be patient as you insert the louvers into the stiles—the stiles may split if you try to force a too-large louver into them. Glue the rails in place.

Rip both stiles from one workpiece, then rip the rails.



Use a gentle hand to attach the stiles to the louvers. To avoid splitting the stiles, remachine any louvers that don't fit.

Continued

BISCUIT JOINERY WITH A ROUTER? YOU BET!

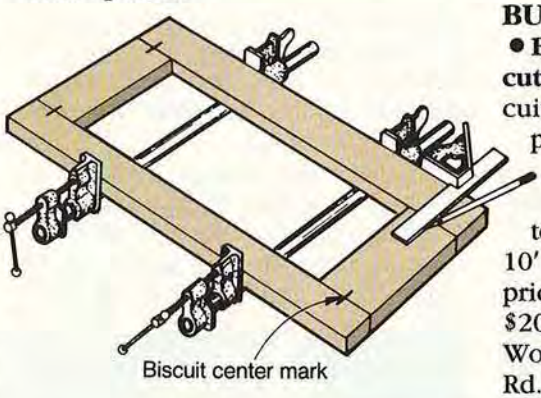
Brad Witt built his first router table when he was 12, and in the 24 years since then, he's parlayed his router expertise into a full-time router-accessories business. So naturally, as plate joiners (sometimes called biscuit joiners) grew in popularity among home woodworkers during the past five years, Witt explored ways that a router could do the same job. His answer: Use a slotting cutter in a table-mounted router to cut a hole that accepts the football-shaped wooden biscuits. That was the easy part.

Since standard plate-joiner biscuits don't fit the slotting-cutter hole, the hard part was fashioning some biscuits that would fit into this slot. Now, Witt markets a biscuit (see the Buying Guide at *right*) that not only fits, but also has a clear advantage over standard 1¾"- to 2⅜"-long biscuits. With a length of only 1¼", you can use Woodhaven's biscuits on 1½"-wide face frame members. The pressed-wood biscuits will slide easily into a ¼" slot, then expand when glued to form a solid joint.

Here's how Brad's system works: First, build the fence shown *below* and obtain a 1½"-diameter, ¼" slotting cutter with a ½" pilot bearing (see Buying Guide at *right*). Then, dry-clamp together your frame, and mark the centers of the joints as

A router table can handle many of a plate joiner's jobs.

shown *below*. Now, center the fence on the router table by raising the slotting-cutter's pilot through the hole in the fence's acrylic guard. Clamp the fence in place. Line up the biscuit center mark of your workpiece with the scribed centerline on the fence guard, and clamp a square scrap board to the table to guide the workpiece into the cutter as pictured *above*. After cutting the slots, apply glue to all the joint edges, and assemble the frame pieces.



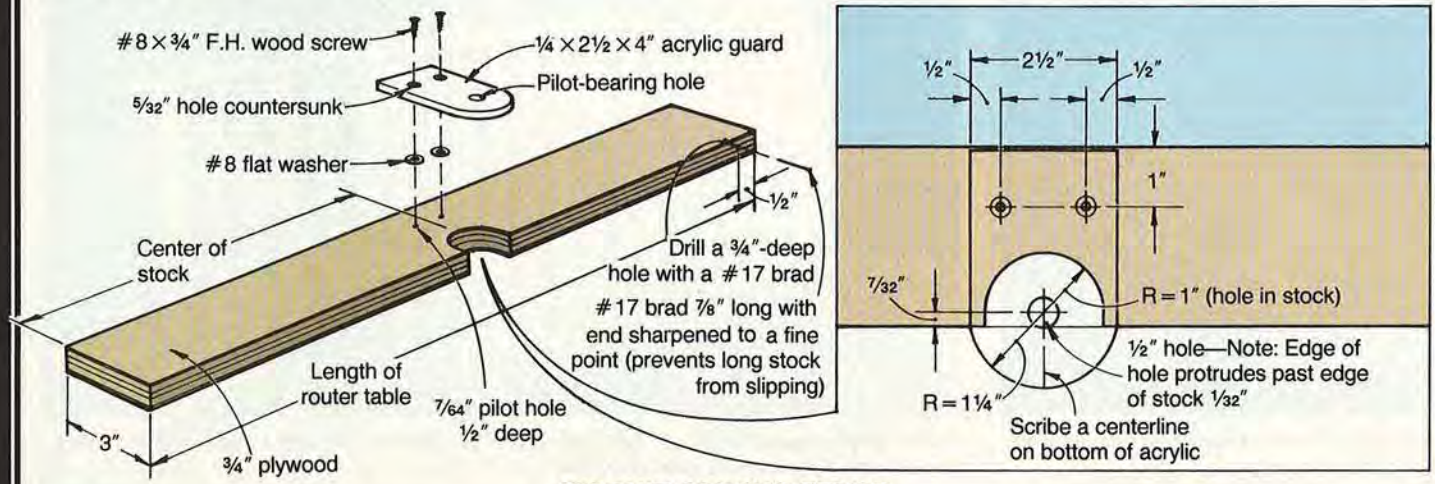
MAKE SUPER-SIMPLE

Our good buddy Paul McClure, a crackerjack wood technologist, has done nearly everything in woodworking—he's been an instructor, exotic hardwood buyer, and retail woodworking store owner. So it didn't surprise us when this regular contributor to *WOOD* magazine came up with a slick way of making door frames. His technique uses ¾"-thick stock and calls for ⅜" rabbeted edges to help form strong joints between the rails and stiles. The rabbet accommodates a plywood panel or ⅛" glass with ¼" stops as shown at *right*.

First, set a ⅜" rabbeting bit for a ⅜"-deep cut. To test this, cut a few scrap blocks from the frame stock, and adjust the bit's depth until it removes exactly one-half of the thickness of the stock. We routed the scraps shown at *right middle* to demonstrate some test results.

BUYING GUIDE

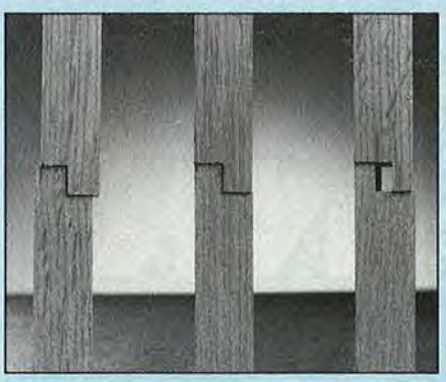
• **Biscuits, splines, and slotting cutter.** 100 compressed wood biscuits, item 905, $7.99; 10′ of compressed spline, item 907, $7.99; ¼" slotting cutter, item 902, $26.99. Kit with slotting cutter, straight bit, 100 biscuits and 10′ of spline, item 901, $59.99. All prices ppd. unless order is under $20 (then add $3 for postage) from Woodhaven, 5323 W. Kimberly Rd., Davenport, IA 52806.


#8 × ¾" F.H. wood screw
¼ × 2½ × 4" acrylic guard
Pilot-bearing hole
5/32" hole countersunk
#8 flat washer
½"
Center of stock
Drill a ¾"-deep hole with a #17 brad
#17 brad ⅞" long with end sharpened to a fine point (prevents long stock from slipping)
Length of router table
7/64" pilot hole ½" deep
3"
¾" plywood
½"
2½"
½"
1"
7/32"
R = 1" (hole in stock)
½" hole—Note: Edge of hole protrudes past edge of stock 1/32"
R = 1¼"
Scribe a centerline on bottom of acrylic

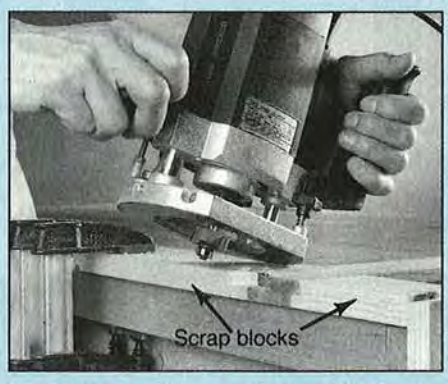
BISCUIT-JOINING FENCE

FRAMES WITH A 3/8" RABBETING BIT

A router provides you an easy way to make attractive frames with smooth, clean rabbets.

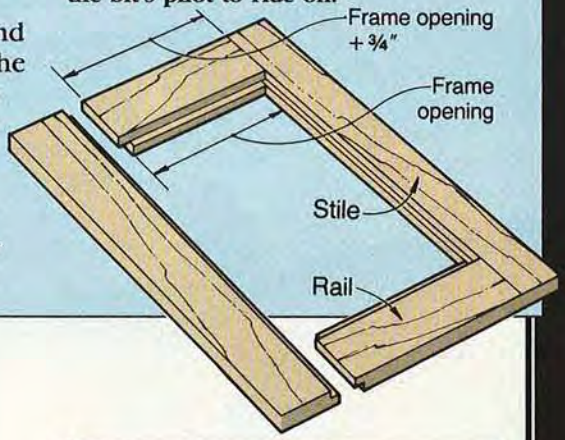


Our tests produced from *left*, a too-shallow cut, a correct cut with flush faces, and a too-deep cut.



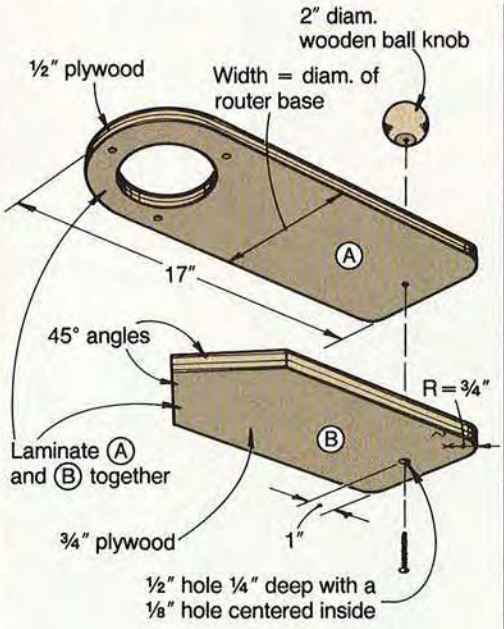
Scrap blocks (one with a rabbet) provide a straight, continuous surface for the bit's pilot to ride on.

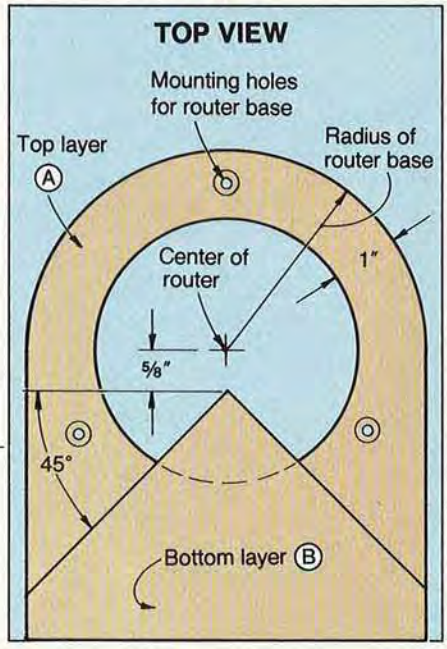
Now, refer to the drawing at *right* as a guide and cut the stiles to length and the rails to the width of the frame opening plus ¾" to allow for the two ⅜" rabbets. Rout a rabbet along one of the long edges on the backside of each piece. Then, flip over the rails and clamp them to your workbench as we're doing *above*. Before rabbeting each end of both rails, you must align the ends of the rails flush with the scrap blocks so the bit's pilot has a straight surface to ride on. This arrangement prevents the router from tearing out the corners of the workpieces or rounding them off.



FLUSH-TRIMMING JIG SAVES YOU LOADS OF TIME

A flush-trimming jig saves you hours of planing and scraping.





We've seen plenty of other jigs for trimming solid-wood edge bandings flush with a plywood surface, but none of them met our requirements for versatility or ease of use. So, ever-resourceful Jim Downing devised the jig *above* that not only trims flush along straight edges, but also works its way into corners.

Once you build the jig and attach your router to it, insert a ½" hinge-mortising bit and adjust it so it's just a hair *above* the plywood surface. Keep a steady hand on both the wooden knob and router handle to give a flat surface.

Written by Bill Krier with James R. Downing
Illustrations: Kim Downing; James R. Downing; Bill Zaun
Photographs: Bob Calmer

Print this article

THE OAK DRY SINK

DESIGNED IN

Before the convenience of indoor plumbing, the dry sink served as the cleanup center in many homes. The top portion of the dry sink held a wash basin, a pitcher of water drawn from the well or cistern, and a bar of lye soap. After use, the basin and dirtied water were often stored in the cupboard portion until the water could be disposed of (often with a toss from the back steps of the house).

Although the dry sink's original use may have gone by the wayside, its good looks endure even today. Stately and sturdy, this oak classic will add a bit of nostalgia to any home setting.

FIRST, CONSTRUCT THE BASIC CUPBOARD

1 Rip and crosscut the cupboard sides (A) and shelves (B) to the sizes listed in the Bill of Materials from ¾" oak plywood.

2 Cut or rout a ⅜" rabbet ¼" deep along the back inside edge of each cupboard side. Mark the location and cut ¾" dadoes ¼" deep on the inside surface of the side panels where dimensioned on the Cupboard-Assembly Drawing.

3 Dry-clamp the pieces together. (The front edges of the shelves are flush with the front of the side panels.) Measure the opening, and cut the back cleat (C) to size. Measure the rabbeted opening, and cut the back panel (D) to size. The bottom of the back panel is flush with the bottom edge of the lower shelf (B).

4 Glue and clamp two shelves between the sides (A). Glue and nail the back (D) in place, checking for square.

5 Cut six glue blocks (E) to size. Glue and clamp the back cleat (C) into position; then add a glue block at each end for support. Set the other blocks aside for now.

THE FINE-FURNITURE TRADITION

NOW, CONSTRUCT AND ADD THE FACE FRAME

1 Cut the face-frame stiles (F), rails (G, H), and the mullion (I) to the sizes listed in the Bill of Materials.

2 Dry-clamp the pieces together where located on the Face-Frame Drawing. Using the drawing for reference, mark dowel location lines across each joint.

3 Using the drawing at *right,* transfer the full-sized pattern to each end of the lower rail (H).

4 Remove the clamps and drill 3/8" dowel holes 13/16" deep where marked (we used a doweling jig). Bandsaw the bottom rail to shape.

5 Checking for square, glue, dowel, and clamp together the face frame as shown in the photo *below right.* (We used dowel pins—those with precut grooves—instead of cutting dowel stock to length. To prevent the clamp jaws from denting the frame, we inserted clamp blocks.) After the glue dries, remove the clamps and sand the frame.

6 With the side and top edges flush, glue and clamp the face frame to the cupboard.

CUT AND ATTACH THE GUIDES AND KICKER

1 Cut the drawer guides (J) and kicker (K) to size. Set the guides aside for now.

2 Glue and clamp the kicker (K) in position, using the remaining four previously cut glue blocks (E) for support.

FRAME THE PLYWOOD TOP WITH WITH SOLID OAK

1 Cut the plywood panel (L) to size. Cut the banding pieces (M, N) to size, miter-cutting the ends.

2 Glue and clamp the banding to the plywood panel, checking that the top surfaces are flush.

3 After the glue dries, remove the clamps. Sand the assembly smooth, being careful not to sand through the thin veneer when sanding the top of the banding strips flush with the top of the center panel.

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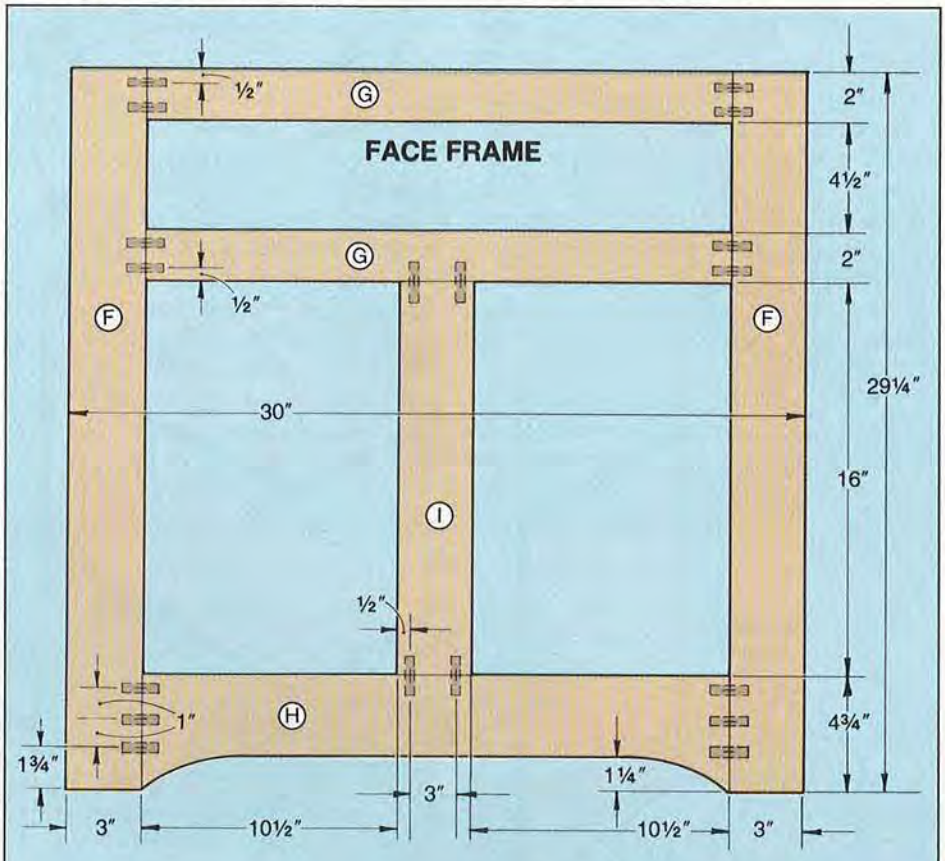
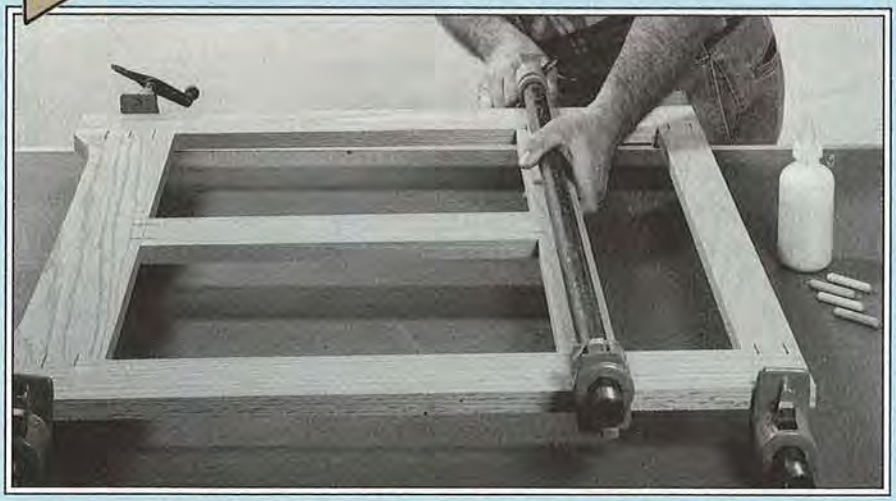
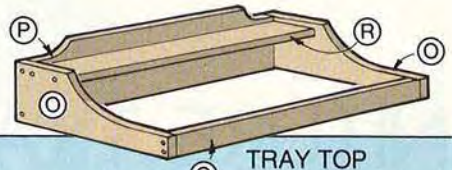




Dowel, glue, and clamp together the face frame, checking for square.

DRY SINK



Attach back panel (D) into rabbet with 1"x17 brads

29¼"

25¼"

Miter corners

18"

TOP PANEL

⅝" shank hole; countersunk on inside face

¾" dowel 15¾" long; ⅛" chamfer on both ends

Center towel bar from side to side and 2" from the top edge of (A)

2½"

#8×1¼" F.H. wood screw

#6×¾" F.H. wood screw

⅜" rabbet ¼" deep

16¼"

6½"

¾"

¾" dadoes ¼" deep

29¼"

17¼"

¾"

4"

16"

CUPBOARD

1"

29¼"

1"

Semi-concealed hinge

DOOR

⅜" hole 13/16" deep; mating hole is the same size and depth

⅜" dowel pin 1½" long

FACE FRAME

Cutting Diagram

¾×48×96" Oak Plywood

¼×48×48" Oak Plywood

¾×9¼×96" Oak

¾×7¼×60" Oak

¾×9¼×96" Oak

½×5½×60" Oak

*Plane or resaw to thickness stated in the bill of materials

Bill of Materials

	Parts	Finished Size* T	W	L	Mat.	Qty.
	BASIC CUPBOARD					
A	sides	¾"	16¼"	29¼"	OP	2
B	shelves	¾"	16"	29"	OP	2
C	cleat	¾"	2"	28½"	O	1
D	back	¼"	29¼"	25¼"	OP	1
E	glue blocks	¾"	¾"	2"	O	6
	FACE FRAME					
F	stiles	¾"	3"	29¼"	O	2
G	rails	¾"	2"	24"	O	2
H	bottom rail	¾"	4¾"	24"	O	1
I	mullion	¾"	3"	16"	O	1
	GUIDES, KICKER, AND TOP PANEL					
J	guides	⅜"	¾"	16"	O	2
K	kicker	¾"	2"	15¼"	O	1
L	plywood panel	¾"	16"	29"	OP	1
M	front/ back	¾"	1"	31"	O	2
N	ends	¾"	1"	18"	O	2
	TRAY TOP					
O	sides	¾"	6"	17½"	O	2
P	back	¾"	7¼"	28½"	O	1
Q	front	¾"	2"	28½"	O	1
R	shelf	¾"	4¼"	28½"	O	1
	DRAWER					
S	front	¾"	5"	24½"	O	1
T	sides	½"	4¼"	15¾"	O	2
U	back	½"	3⅝"	23¼"	O	1
V	bottom	¼"	13½"	23¼"	OP	1
	DOORS					
W	stiles	¾"	2"	16½"	O	4
X	rails	¾"	2"	7"	O	4
Y	panel	¼"	7¾"	13¼"	OP	2
	TOWEL BAR					
Z	holders	¾"	2"	2¼"	O	2

Material Key: OP-oak plywood, O-oak.
Supplies: 1"×17 brads, ⅜" dowel pins 1½" long, ¾" dowel 15¾" long for towel bar, #8×1¼" flathead wood screws, #6×¾" flathead wood screws, stain, finish.

NOW, CONSTRUCT THE TRAY TOP

1 Using ¾" oak stock, cut the tray top sides (O), back (P), front (Q), and shelf (R) to the sizes listed in the Bill of Materials.

2 To enlarge the grid pattern for the curved portion of the sides (O), cut a piece of light cardboard (we used the back of a writing tablet) to 6×11", and draw a 1" grid on it. Using the side-piece grid pattern *below* as reference, lay out the curved outline on the marked grid. To do this, mark the points where the pattern outline crosses each grid line. Then, draw lines to connect the points. Cut the cardboard pattern to shape, and use it as a template to mark the curved portion on each side piece. Bandsaw the side pieces to shape.

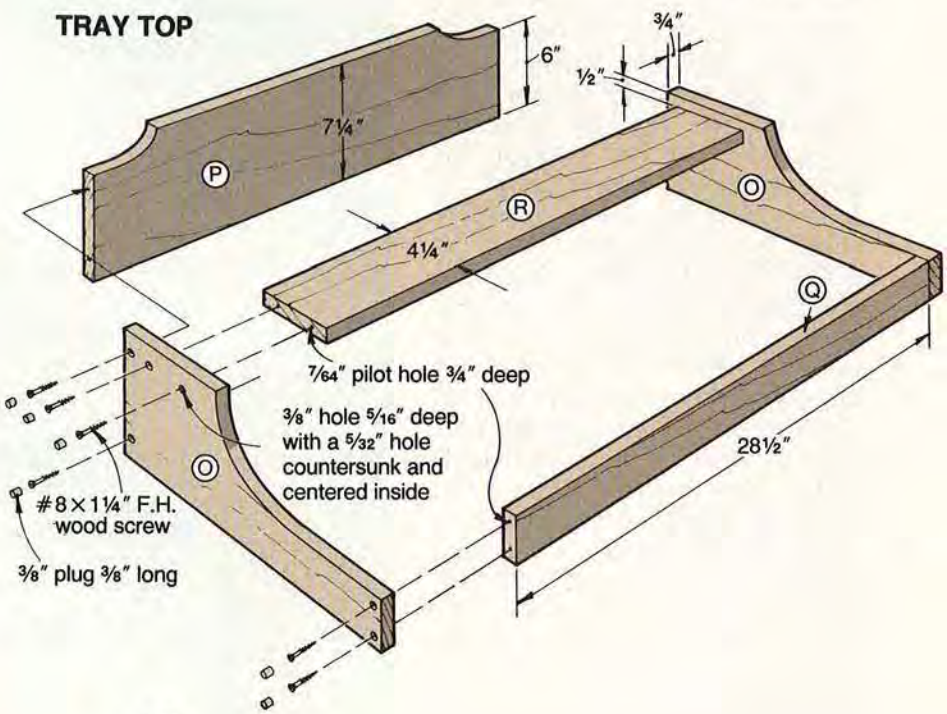
3 Using the full-sized curve pattern, mark the curved lines on the back piece (P). Cut the curves to shape.

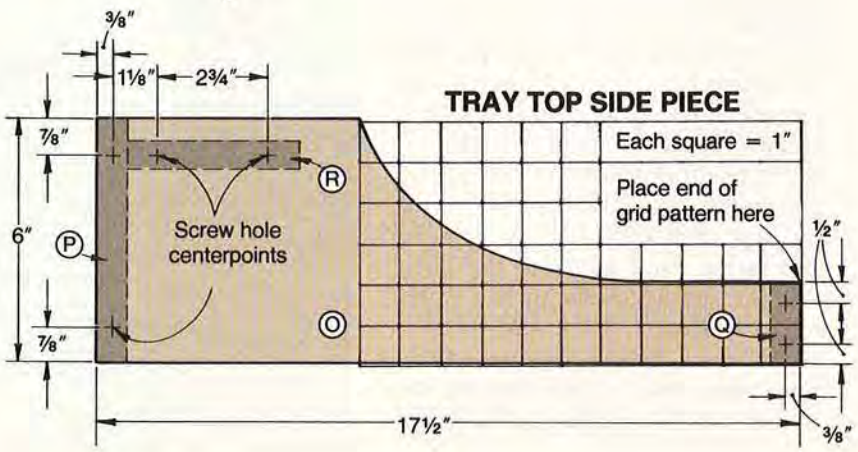
4 Dry-clamp the pieces together. Mark the screw-hole centerpoints on each side piece (O), where located on the Tray Top Side Piece Drawing. Drill the holes to the sizes listed on the drawing.

5 Remove the clamps. Now, glue and screw together the assembly.

6 Plane a piece of oak stock to 7/16" thick. With a ⅜" plug cutter, cut twelve ⅜" plugs from the 7/16" piece, and plug each screw hole. Sand the plugs flush.

Continued





DRY SINK

ASSEMBLING THE DRAWER—NOTHING TRICKY HERE

1 Cut the drawer front (S), sides (T), back (U), and bottom (V) to the sizes listed in the Bill of Materials. To house the drawer bottom, cut or rout a ¼" groove ¼" deep and ⅜" from the bottom edge into the drawer sides and front where shown in the drawing at *right*.

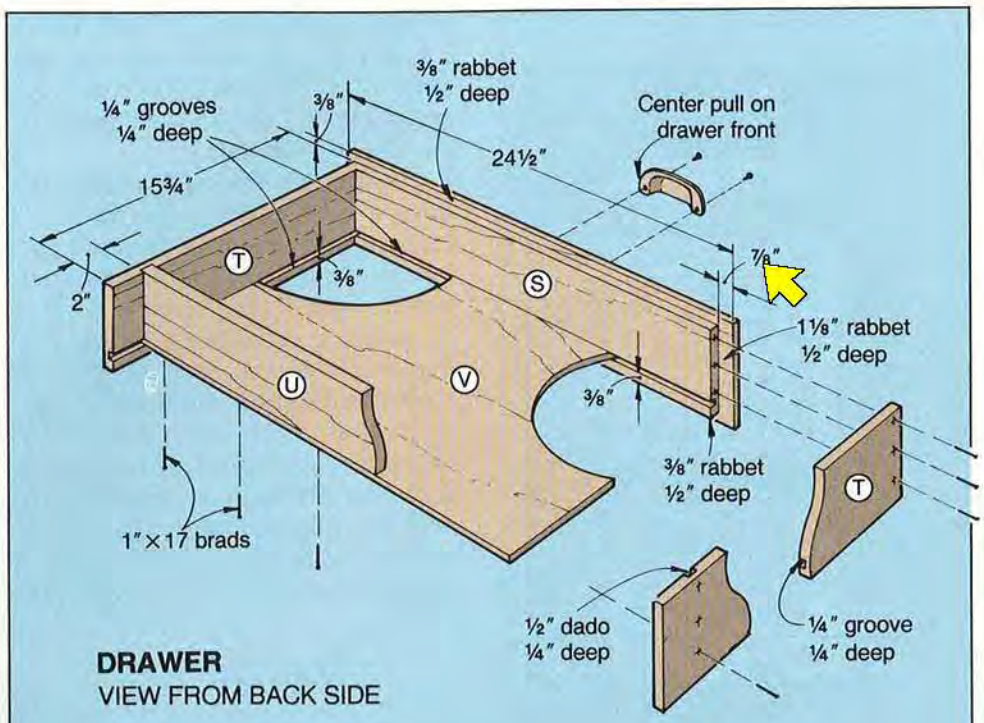
2 Cut a ½" dado ¼" deep and 2" from the back edge of each drawer side to house the drawer back.

3 Cut a 1⅛" rabbet ½" deep across both ends on the back surface of the drawer front where shown on the drawing at *right*. Now, cut a ⅜" rabbet ½" deep along the top and bottom edges on the back face of the drawer front.

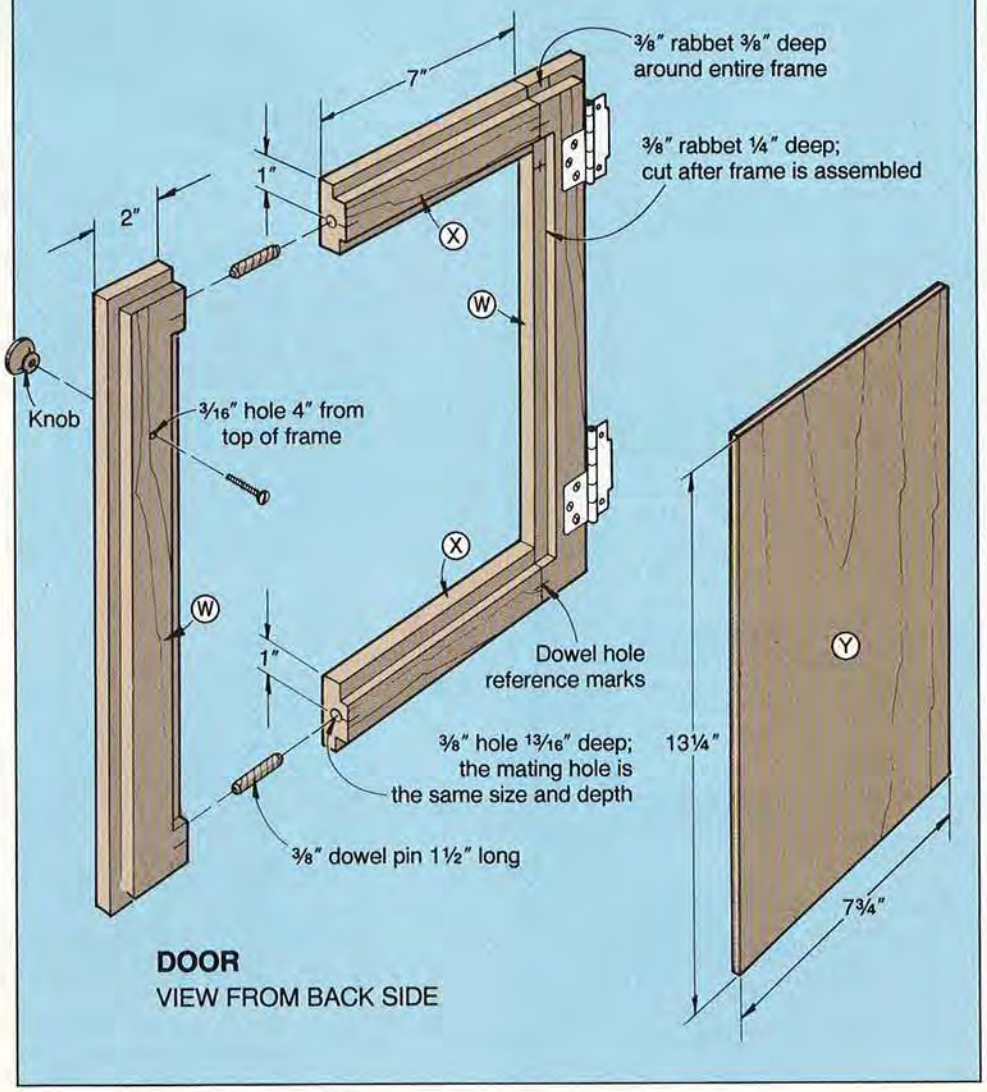
4 Center the pull on the drawer front, and mark the mounting hole locations. (See the Buying Guide on the opposite page for our hardware source.) Drill the mounting holes into, but not through, the front side of the drawer front.

5 Dry-clamp the drawer pieces to check the fit. Glue and clamp together the sides, front, and back, checking for square. Do not glue the bottom (V) in the ¼" groove; instead, drill 1/16" pilot holes through the bottom panel and ½" into the bottom edge of the back piece (U). Secure the bottom panel to the back with 1" brads. (To catch the glue squeeze-out and to make cleanup easier, we placed masking tape along the inside surface of the drawer and next to the joints. After the glue dried, we peeled off the tape, removing the excess glue.)

6 Center the drawer in the opening. Working from the top, position the drawer guides (J) next to the outside edge of the drawer sides. Once properly located, remove the drawer without moving the guides, and mark the guide locations on the top shelf (B). Drill pilot holes and fasten each guide to the shelf. Put the drawer back in the opening, and slide it back and forth to check its fit. For a minimum of free play from side to side, adjust the position of the guides if necessary.



DRAWER
VIEW FROM BACK SIDE



DOOR
VIEW FROM BACK SIDE

RETURN TO THE BASICS TO BUILD THE DOORS

1 Cut four door stiles (W) and four rails (X) to the sizes listed in the Bill of Materials.

2 Clamp together each door frame, and mark dowel-hole reference marks across the joints where shown on the Door Drawing *below left*. Remove the clamps and use a doweling jig and portable drill to drill 3/8" holes 13/16" deep. (We wrapped masking tape onto our drill bit at the right height to ensure consistent depths when drilling the dowel holes.)

3 With 3/8×1½" dowel pins, glue, dowel, and clamp together each door frame. Wipe off excess glue with a damp cloth. Later, remove the clamps and sand smooth.

4 Cut a 3/8" rabbet 3/8" deep along the back outside edge of each door frame. Rout a 3/8" rabbet 1/4" deep along the inside edge of each door on the back face for the door-panel insert (Y). Mark reference lines, and chisel each corner square as shown in the photo *below left*.

Mark and square the the round-rabbeted corners with a sharp chisel and a mallet.

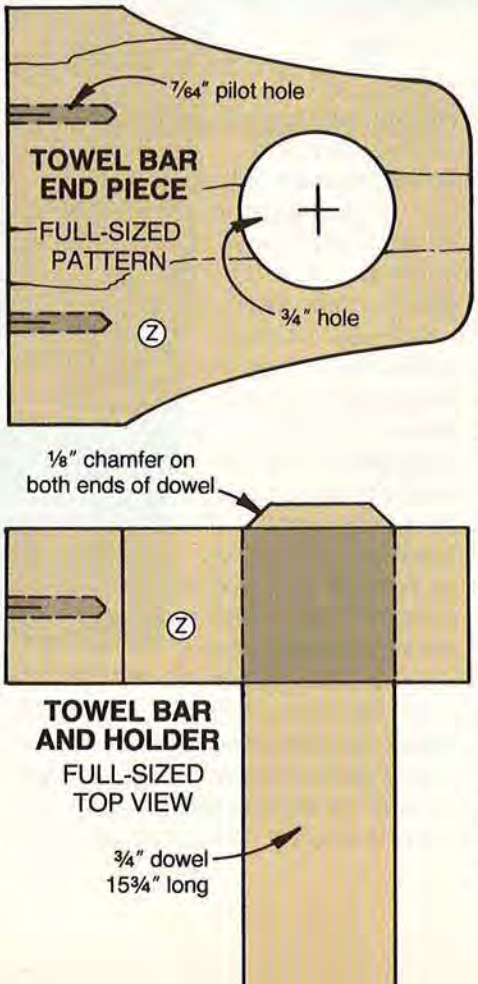
5 Measure the opening, and cut the door panel insert (Y) to size. Glue the panels in place. Sand smooth, and attach the hinges.

ADD THE TOWEL BAR AND THEN THE TRAY TOP

1 Cut the towel-bar holders (Z) to shape, using the full-sized pattern *below*. Bore a 3/4" hole through each where marked. Drill a pair of 7/64" pilot holes where marked and centered from edge to edge.

2 Cut a 3/4" dowel 15¾" long. Sand a 1/8" chamfer on each end of the dowel where shown *below*. Glue a towel-bar holder (Z) to each end of the dowel, letting the dowel protrude 1/8" on the ends of the holders. Set the assembly on a flat surface to ensure that the holders are flush with each other.

3 Snip the heads off four 8d nails. Stick a nail in each pilot hole in the holders. Position the towel bar on the right-hand side of the cupboard 2" from the top edge of the side piece (A). Squeeze the holders against the cabinet side to transfer the hole locations. Drill a 5/32" shank hole at each indentation. Countersink the holes on the inside face of the cabinet. Screw the towel-bar holders to the cabinet side.



4 Glue and clamp the tray assembly to the top panel with the back edges flush and centered from side to side. Later, glue and clamp the tray top assembly to the cabinet.

FINISHING AND FINAL ASSEMBLY

1 Remove all the hardware and sand the dry sink smooth. Stain the unit and apply the finish. We used medium-oak stain and applied it to the wood, wiping with the grain with a clean cloth. A few minutes later, we wiped off the excess stain with a second clean cloth. Then, we applied a coat of polyurethane sanding sealer to all surfaces. After letting the sanding sealer dry, we wrapped 320-grit sandpaper around a wood block, and lightly sanded the surfaces. The wood block helps to prevent applying too much pressure to a small area and rubbing through the finish. Next, we wiped off the sanding dust with a tack cloth, and applied two coats of satin polyurethane, sanding between coats with 0000 steel wool. Rubbing with steel wool between coats allows the following coat of finish to adhere better to the first, and also smooths out any rough spots and bubbles in the finish.

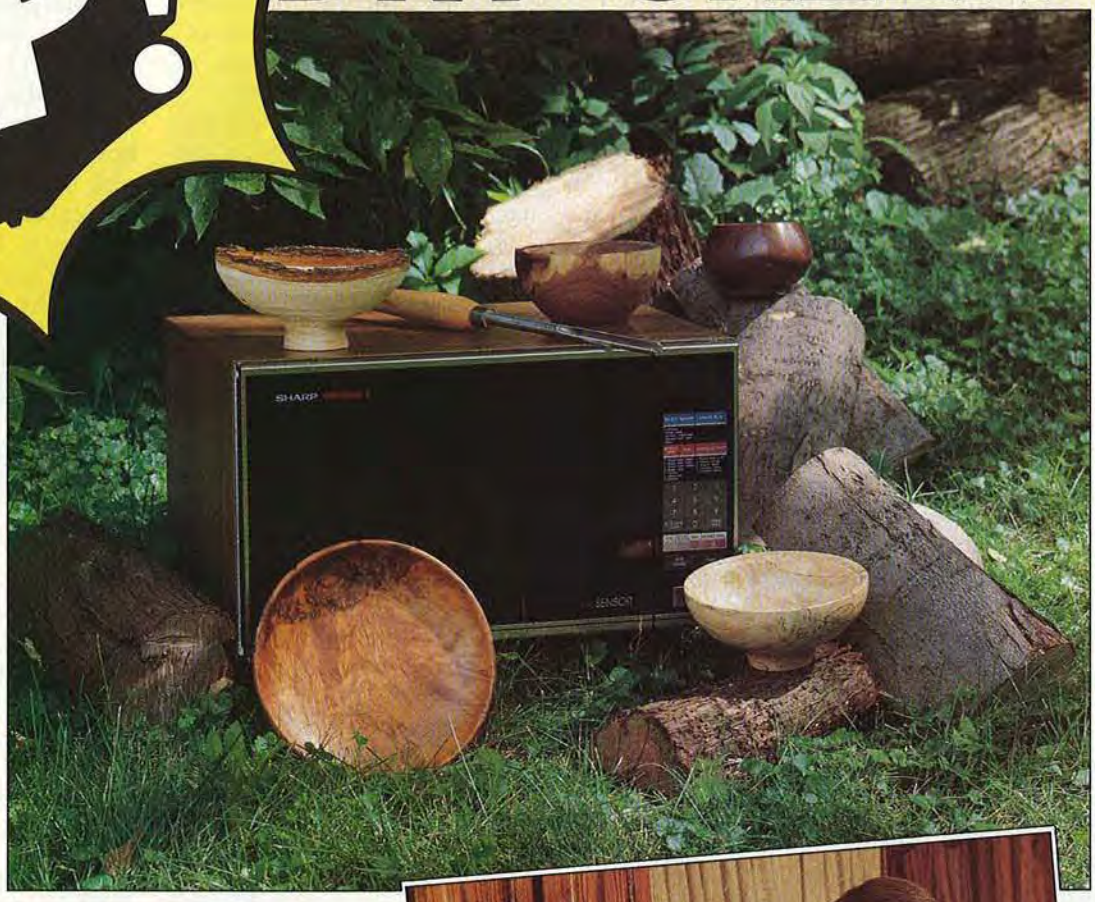
2 Attach the hardware and hang the doors.

BUYING GUIDE

● **Forged-iron hardware kit.** Two 1" knobs, two pairs of self-closing hinges, one cast-iron bin pull. Catalog no. 8704, $29 ppd. Paxton Hardware, Ltd., 7818 Bradshaw Road, Upper Falls, MD, 21156. Call 301/592-8505 to order.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Jim Kascoutas
Illustrations: Kim Downing; Bill Zaun

ZAP! DRY GREEN



Print this article

Drying your green-turned bowls by microwave isn't foolproof by any means—it takes a little testing. But when it works, great hoppin' microwaves, do you ever get quick results!

Walt Panek's house has a well-worn path between shop and kitchen. It's not that this Kingsport, Tennessee woodworker works up an unusually large appetite from his hobby. On the contrary, it's because the kitchen microwave serves double-duty now that Walt has discovered that it can actually dry his green turnings.

"A few years back, I used the microwave only to 'treat' the occasional rough-turned bowl or vase that I made from chunks of an insect-infested log. Then, I would set the pieces aside to season until they were dry enough to finish-turn," Walt recalls. "When I microwaved them, though, I noticed that the pieces came out of the oven considerably lighter, and with no ill effects. The microwave was drying the wood. So, I began to experiment a little more."

Walt Panek dries green-turned bowls in the kitchen.

After successfully drying rough-turned bowls, Walt took the next logical step in his experiment. "I completely finish-turned a bowl to its final thickness before microwave-drying. I learned that I didn't have to leave the walls a uniform thickness to prevent warpage, as with the traditional finish-turn, then air-dry method," he notes. "I found that I could turn the walls to any desired thickness or a combination of thicknesses within the same turning. For example, if I wanted to leave a thick, heavy base on a bowl for stability, I could do it without fear of the base cracking."

Discovery after discovery marked

BOWLS IN MINUTES

Walt's continuing experiments. "I found out that besides being faster, microwave-drying has other interesting advantages," he continues. "For instance, sometimes when finish-sanding a green-wood turning on the lathe, developing heat caused checks and surface cracks to show up. But, I found that even fairly large cracks usually disappear in the microwaving cycle. And, frequently small checks will appear during the microwaving, but these also disappear within a few hours. This is probably due to the dry wood regaining moisture from the air, which swells the fibers and closes the cracks."

BENDABLE BOWLS

An air-dried, green-turned bowl always distorts a little. And, according to Walt, distortion occurs in microwaving, too. "The microwave-dried bowl won't go out of shape as much, though. Also, you can return it to the original shape by applying hand pressure immediately after you take the still-hot bowl from the oven. And, if you want, you can create some interesting shapes with the hot, plasticlike wood," he adds. "I've made wavy edges, a pour spout, and even pushed a bowl into an extreme oval. Naturally, the thinner the bowl, the easier it bends and holds its shape. All wood responds differently to shaping, however. I've noticed that apple works well."

Walt observed another interesting phenomenon when he turned a natural-edge bowl—one with the bark left intact. He discovered that microwaving makes the bark stay on better. "After microwave drying, the bark won't be as fragile, either. And, the sapwood, which I've found to be soft and pulpy before drying in the microwave, becomes firm afterward."

PICK YOUR APPROACH TO MICROWAVING

In microwave-drying green-wood turnings, you can choose one of two methods—the cautious approach or the go-for-it-all route. The first almost guarantees you a round bowl. That's because it basically follows the traditional method: Rough-turning a green blank to from 3/4" to 1" wall thickness, microwave-drying, then finish-turning and sanding. The difference is time—instead of several months of drying, it takes less than an hour!

In the go-for-it-all method, you aim to turn the green-wood bowl to finish thickness (usually from ⅛" to ⅜"), microwave dry, then sand. You end up with a finished bowl in a fraction of the time you're accustomed to.

When Walt practices the go-for-it-all method, he adds an unusual twist. "If I want to sand the bowl while it's still on the lathe, I apply a coat of sealer, sand it, then dry it in the microwave. The sealer seems to make the sanding easier, and it doesn't alter the drying time or the results," he notes.

"Get to know your microwave and its settings. But, don't be afraid to experiment."

—Walt Panek

In his experiments with his 650-watt oven, Walt found that the actual drying time, as well as oven setting needed, varies with the type of wood, its moisture content, and the bowl's wall thickness. "For one of my typical bowls—turned from fresh-cut maple to a ¼" wall thickness—I start with a four-minute drying cycle at a 40 percent power setting," he says. "There may be some signs of moisture escaping from the end grain—water vapor and hissing, popping sounds. I closely watch the bowl on the initial cycle to be sure there is no excessive steam escaping or moisture boiling out. If there is, the setting is too high," Walt advises. (See the chart, *next page*, for comparable settings on other microwaves.)

"After the first heat cycle, I remove the bowl from the oven and check the temperature by feel. If it's too hot to hold comfortably in my hand, I reduce the percentage setting on the next cycle," he continues. "Otherwise, after about a five-minute cooling cycle, I reheat for another four minutes."

After the second or third heat/cool cycle, the Tennessee turner quite often spots small checks appearing on the bowl's surface near the end grain. His experience tells him that they're nothing to worry about. They simply disappear. "I've even closed large or excessive cracks by putting the bowl under cool running water for a few seconds," Walt says.

The whole microwave-drying process takes three to four heat/cool cycles to dry most bowls, according to Walt. How can you tell when they're dry? "When you don't see any more signs of moisture escaping from the end grain and the bowl feels warm and dry to the touch," he advises.

"If I decide to reshape the bowl after it's dry, I have to get it hot again," Walt continues. "What has worked for me is to put it back in the microwave for one minute on high (100 percent). That makes most pieces flexible enough to hand-bend or clamp into shape. To make sure a bowl stays round, turn it upside down on a flat surface and clamp it overnight."

Walt finishes his bowls after they have cooled by power-sanding them with adhesive-backed disks to remove any raised grain or water stains. And, there's a bonus at this stage, too. "Sanding goes easy. Due to the wood's extreme dryness, the paper doesn't load up," he says. "After sanding, I normally apply an oil finish, but I've used varnish, lacquer, and wax, too."

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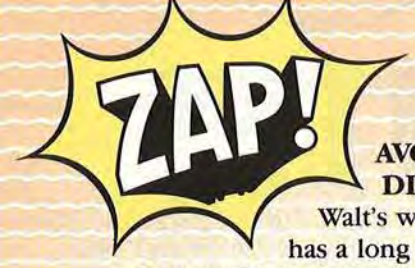


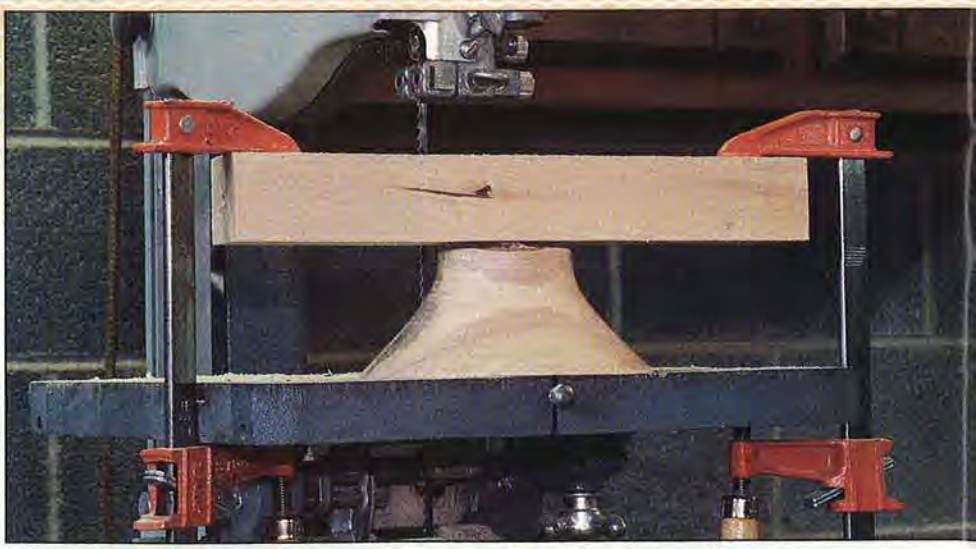
AVOIDING DISASTER

Walt's wife, Sally, has a long memory. He says she can't forget his most dramatic disaster in microwave drying—and neither will he. "I had a 12" diameter by 5" deep spalted maple bowl that I turned to a uniform ⅛" wall thickness. I put it in the microwave as usual, but I inadvertently set the oven on 100 percent [high] rather than on 40 percent, and left the room. I returned in less than five minutes and the kitchen smelled like it was on fire. It wasn't, but my bowl had charred to the point that there was a hole all the way through one side," Walt chuckles. "The smell of burnt wood lingered in the oven for about three weeks, even with the door left open. That served as a real reminder to keep my mind on what I was doing when working with the microwave."

In addition to the chance of burning caused by mis-setting the controls, microwave-drying does present a few other, if small, problems. According to Walt, if the bowl is heated at too high a percentage setting on the initial cycle, it's more likely to have large cracks appear. Too, some wood may honeycomb, that is, develop a multitude of small fractures in a fanlike formation from the center to the outer edges. After regaining moisture from the atmosphere, the cracks may close. Or, especially on thicker-walled bowls, they may not.

"And, some light-colored woods will discolor where the moisture escapes from the end grain," says Walt. "This can sometimes be sanded off, but not always."

Walt has a final word of advice, too. "Get to know your microwave and its settings. But don't be afraid to experiment. I'm glad I did because this drying technique has greatly increased my enjoyment and capabilities in woodturning. Now, I'm able to finish a project in one continuous operation. The only limits are my imagination and the size of my wife's microwave."



Clamping a bowl overnight after microwaving helps keep it round.

HOW TO TRANSLATE MICROWAVE SETTINGS

Nancy Byal, executive food editor for *Better Homes & Gardens®* magazine, says that most microwave ovens fall into the following power categories: 600- to 700-watt ovens (High), 400- to 550-watt ovens (Medium), and 400-watt ovens (Low). "In general, high-watt ovens require shorter cooking times," she says.

To determine your oven's output wattage, check the owner's manual or the oven label on the back of the appliance. If you can't find the rated wattage, you can figure it out (this test won't work at high altitudes).

In a 2-cup measure, heat 1 cup tap water (about 70°), uncovered, on 100% power (high). If the water boils in under three minutes, your oven probably has 600 watts or more. If the water takes longer than 3 minutes to boil, your oven produces less than 600 watts.

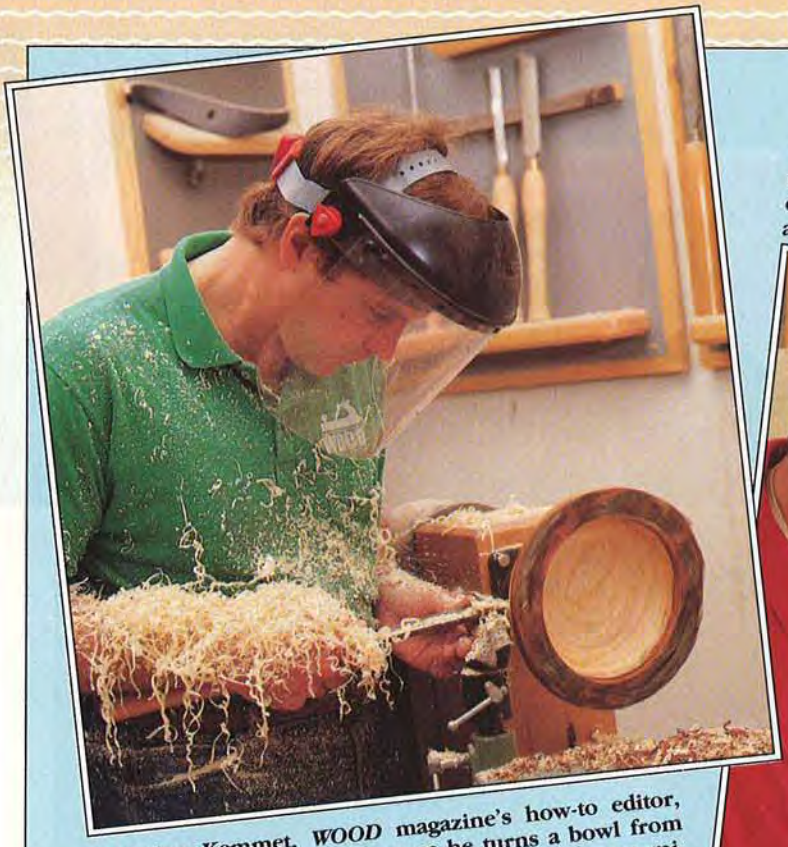
According to Nancy, microwave settings, unlike a conventional gas or electric oven, have little direct relationship to heat. Power levels, expressed as 100% or high, 70% or medium-high, etc., refer to the amount of time the oven is generating microwaves. For example, 50% means half the time the oven is on it is generating microwaves.

Here's help in translating the settings on your microwave or comparing them to those mentioned in this article:

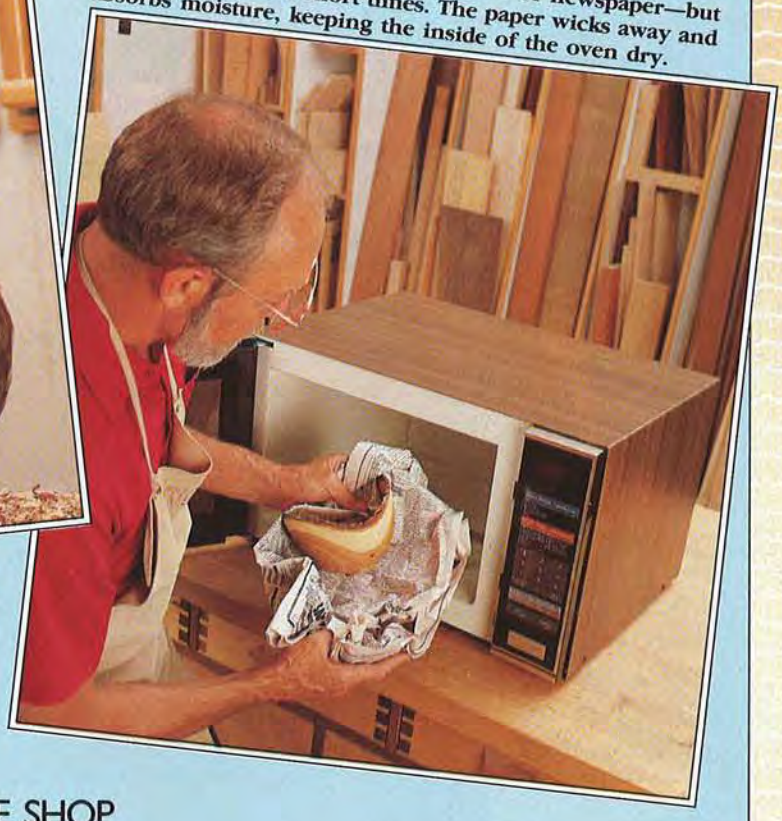
Comparative microwave power settings*

Percent	Number	Word rank	Term
100	10	High	Cook
70	7	Medium-high	Roast
50	5	Medium	Simmer
30	3	Medium-low	Defrost
10	1	Low	Warm

*Medium-power and low-power microwaves require a longer time to cook than a high-power unit on any of the above settings. Also, if your microwave has settings that differ from those above—such as 'fish/poultry' or 'desserts'—you may have to arrive at more quantitative settings by experimenting with the cup of boiling water test described above, or refer to the manufacturer's cookbook or owner's manual to find a comparable relationship.



▲ Marlen Kemmet, *WOOD* magazine's how-to editor, covers himself with shavings as he turns a bowl from fresh-cut elm. Following Walt Panek's step-by-step microwave-drying technique, the bowl turned out great.



▼ Art director Lee Gatzke microwave-dries his green-turned bowls wrapped in three layers of newspaper—but only on defrost for short times. The paper wicks away and absorbs moisture, keeping the inside of the oven dry.

MICROWAVING TIPS FROM THE WOOD® MAGAZINE SHOP

From our experiments and talks with microwave experts in the *Better Homes & Gardens* Test Kitchen, we have found that the following factors can affect your microwave-drying of green-turned bowls:

Microwaves penetrate porous materials more easily than dense materials. Therefore, a dense wood such as Osage orange (.76 specific gravity) would take twice as long to dry as cottonwood (.37 specific gravity), if they were equally green to begin with.

The initial temperature of the wood affects the drying time. Try to start with wood that's at least room-temperature.

Hot spots prevent even drying. Since every microwave oven has its individual microwave pattern, you must observe for uneven distribution and place the bowl accordingly. To find out if your microwave has spots that are bombarded with more microwaves than other parts, watch food cook. Bubbles will first appear in a hot spot because it gets more microwaves. An accessory turntable will help distribute microwave action more evenly, except at the center of the item.

Following a short period of microwaving, let the bowl stand in the oven with the microwaves off. Because moisture attracts microwaves, parts of a bowl that may have a higher moisture content, such as a solid, elevated base, get hotter than wood with less moisture, such as thin walls. Letting it stand distributes the heat. On a bowl with base and walls of uniform thickness, it allows the greater heat accumulated on the edges to move to the center.

High altitude will influence your microwave. Slight changes in cooking times become noticeable at 2,500 feet above sea level and become dramatic above 5,000 feet. At 5,000 feet, water boils at 202° rather than the sea-level boiling point of 212°. In fact, the boiling temperature drops 2° for each 1,000 rise in altitude above sea level. Because of this lower temperature, increase the microwave time slightly. At altitudes above 7,500 feet, however, low air pressure causes faster moisture evaporation, so necessary microwave time actually shortens. At this altitude, you may want to wrap your green turned bowl in microwave-safe paper toweling to slow drying and stave off checking. It also may be necessary to reduce your microwave setting to compensate.

By Peter J. Stephano with Walt Panek
Photographs: Bob Calmer; Jim Hale

Print this article

Heavy-duty ROUTER

Take an impressive stand with your

When it comes to designing workshop tools, you'd be hard pressed to find a better team than Jim Downing, *WOOD*® magazine's design editor, and Jim Boelling, our project builder. Although these guys have put in a ton of hours at the benchtop router table we featured in the April 1985 issue, Jim D. and Jim B. knew that for larger projects, woodworkers needed more—more horsepower, more work surface, and more dust-collection capabilities than our tabletop version offered. We built and tested several prototypes until we decided on this workhorse.

After building and using their latest creation, we know you'll agree that they've done it again. This hefty, professional-quality router table houses a 3hp electronic plunge router that complements the ever-increasing variety of ½"-shanked router bits on the market. It boasts a 24×36" work surface and employs two vacuum pickups for a cough-free workshop. And, after you rout the miter-gauge groove in the tabletop, you can use our box-joint jig shown on the opposite page. Or, drill mounting holes and attach the pin-routing attachment shown.

FEATURES EVERYWHERE . . . JUST TAKE A LOOK!

To install and remove the router from the rabbeted opening in the router table, replace your router's subbase with a large clear acrylic **router plate** (see the Buying Guide on page 51 for our source). The replacement plate also acts as a base when using the router away from the router table. This prevents you from having to change bases every time you hold the router by hand for machining operations.

To keep your shop clean and your lungs happy, connect your vacuum hose to the **upper vacuum pipe** when using the **guard** for operations such as edge molding and rabbeting. In addition, the guard helps to protect the operator from the cutter and flying chips. When you can't use the guard for operations such as dadoing, grooving, and pin routing, switch to the **lower vacuum pipe** to remove dust from below the table and bit. (A dust-free router also lasts longer.)

Attach and align the **split fences** on either side of the guard for plenty of support when routing long pieces. Offset the fences when removing stock from the entire edge of a project. If you don't have a jointer, mount a straight bit to the router, offset the fences slightly, and joint the edges of stock.

Although you could install almost any router in this table, we chose a **3hp electronic plunge model** (see the Buying Guide for our source). In addition to driving your current supply of ¼" bits, this router handles the variety of power-hungry ½"-diameter shanked bits with ease. The electronic **speed control** on the Ryobi router we used works great to lower the speed for larger bits. We liked the Ryobi's **depth-control knob** for ease in raising and lowering the bit. If you already have a large router, see the Buying Guide for our source of auxiliary depth controls.

FIRST, ATTACH THE ACRYLIC PLATE TO THE ROUTER

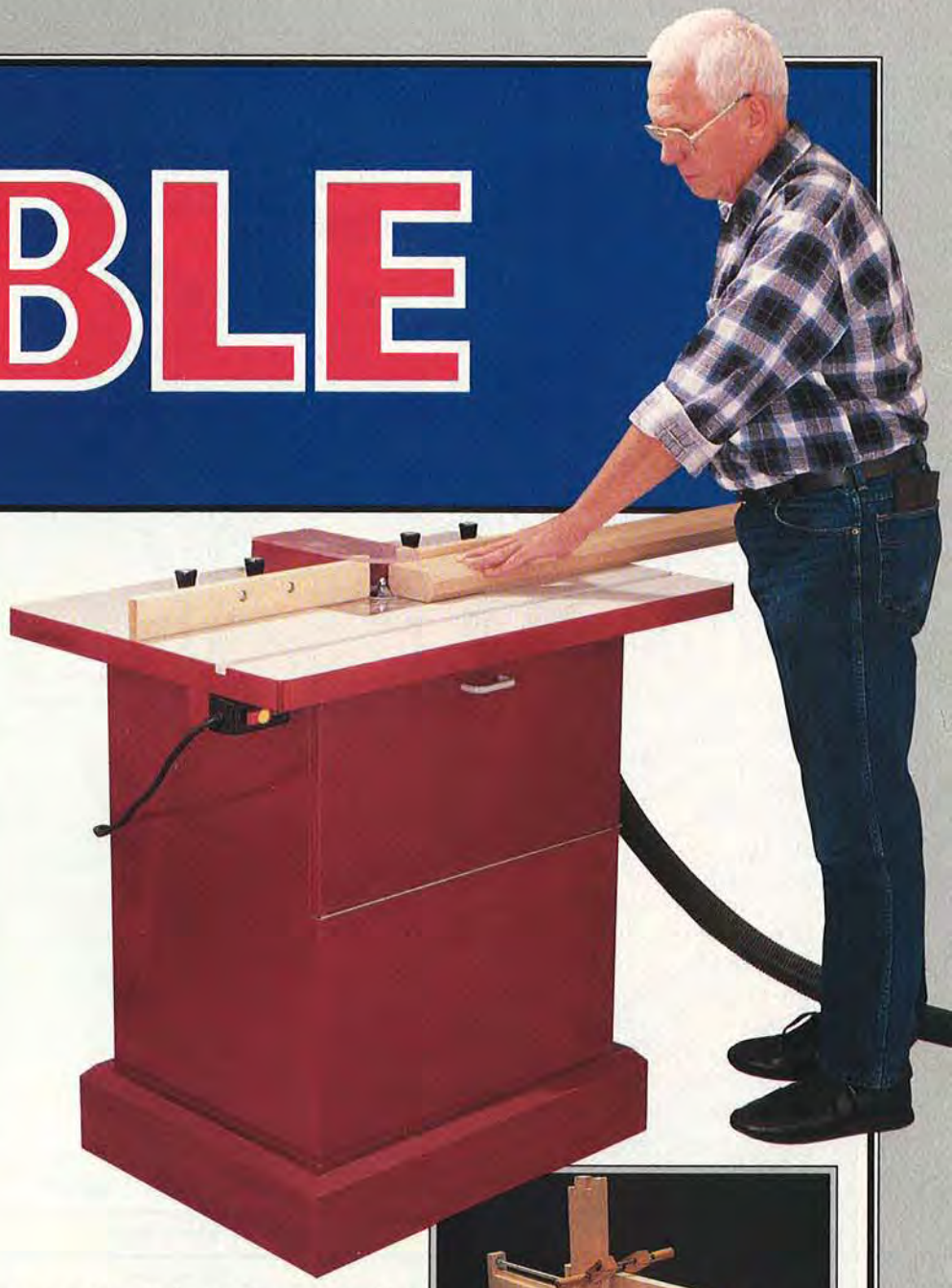
Note: To mount the router to the router table you'll need a piece of ⅜" acrylic. You can buy a piece locally, or see the Buying Guide for our source of precut plates.

1 Remove the subbase from your router. Center and secure the ⅜" acrylic plate to your tool. Locate and scribe the mounting-hole centerpoints on the plate. Remove the plate from the router, and drill and countersink the holes to size.

2 Attach the router plate to your router. If you need longer screws to fasten the plate, our router-plate supplier can provide them. See the Buying Guide for details.

3 Chuck a ¼" straight bit into your router, and slowly plunge the bit through the plate. Remove the plate from the router, and use a circle cutter to cut a hole, centered over the ¼" routed hole, large enough to accommodate your biggest bit (our hole measures 2" in diameter).

TABLE
shop router



CONSTRUCTION BEGINS WITH THE BASE CABINET

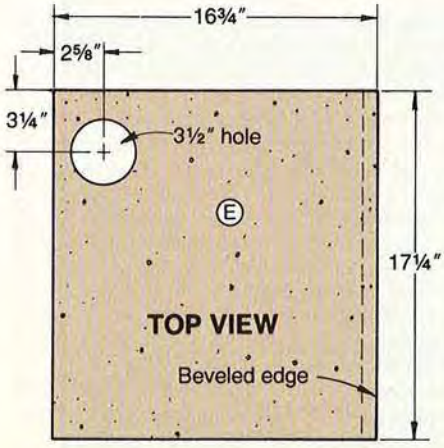
1 Cut the two side panels (A), back (B), and front (C) to the sizes listed in the Bill of Materials from ¾"-thick particleboard.

2 Cut a ¾" rabbet ⅜" deep along the back edge of each side panel.

3 Glue and clamp the back into the rabbet and between side panels. Clamp the front panel to the front of the side panels, checking for square. After the glue dries, remove the clamps and sand the joints.

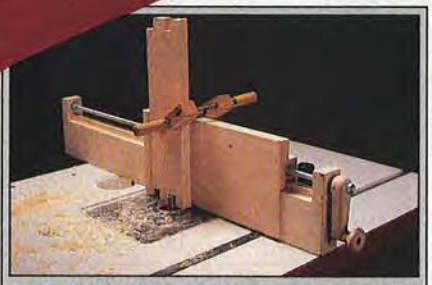
4 Cut the trough sides (D, E) to size, bevel-ripping the top edge of each at 45°. Using the Top View Drawing *below* for reference, mark the vacuum-hole centerpoint on the right-hand trough side (E). Mark the 3½" hole with a compass. Cut the hole to size with a jigsaw. Referring to the dimensions on the Exploded-View Drawing, mark the locations, and saw a pair of vacuum holes in the cabinet side (A).

5 Cut the base-surround parts (F, G) to size plus 2" in length. (We chose birch stock; you also could use good-quality 2×6 material.) Bevel-rip a 1¼" chamfer along the top outside edge and a ¼" chamfer on the bottom outside edge of each piece. Miter-cut the pieces to length, and glue and clamp them to the bottom of the cabinet.



6 Glue and screw together the trough parts (D, E). Set the cabinet on its back, and slide the trough assembly into the cabinet so the top of the trough is 13" from the top of the cabinet where shown on the Section View Drawing.

7 Drill mounting holes, and glue and screw the trough in position. For near airtight joints, caulk all the seams between the trough parts

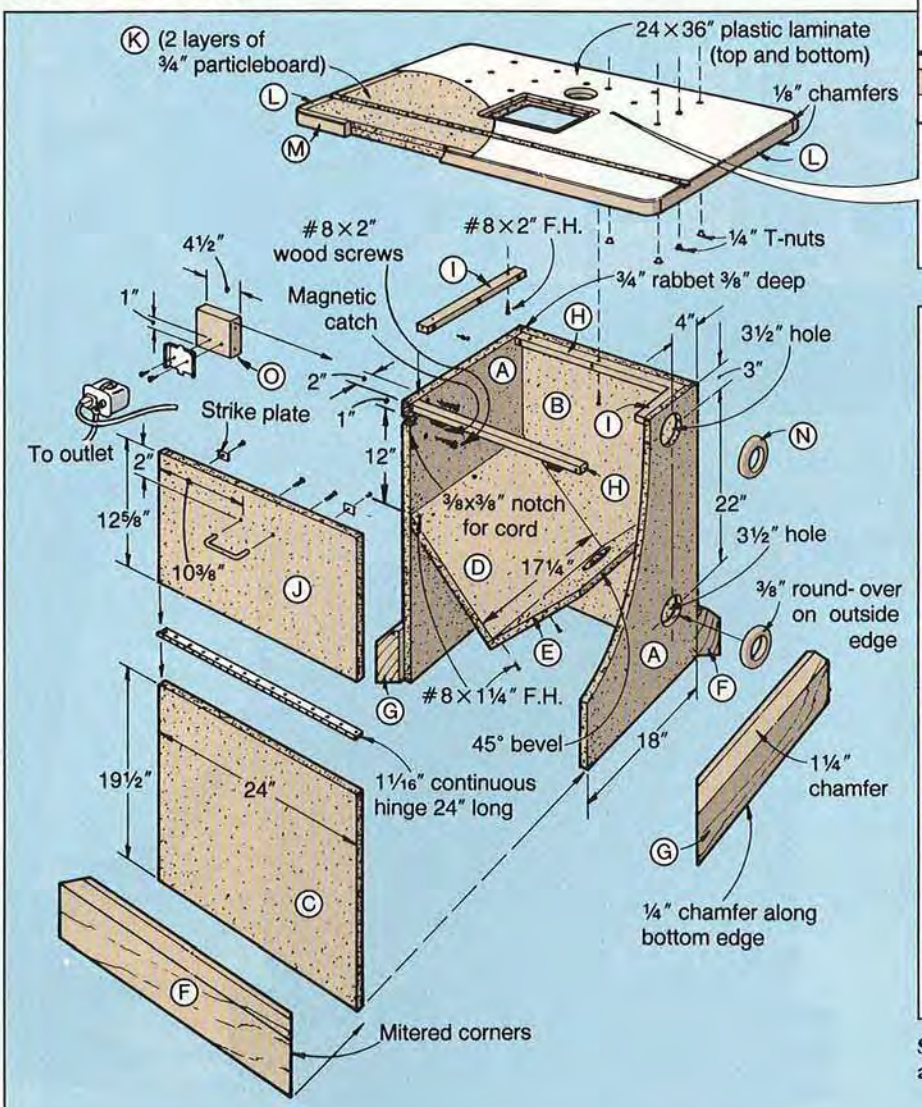


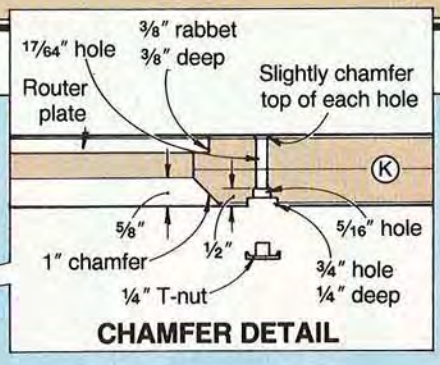
Fitted with the box-joint jig featured in the February 1989 issue.

Fitted with the pin-routing attachment featured in the June 1987 issue.

Continued

ROUTER TABLE





CHAMFER DETAIL

Screw the dust shoot in place, and caulk all joints for a tight seal.

Bill of Materials

Parts	Finished Size* T	W	L	Matl.	Qty.
BASE CABINET					
A sides	¾"	18"	32½"	PB	2
B back	¾"	23¼"	32½"	PB	1
C front	¾"	19½"	24"	PB	1
D trough side (L)	¾"	17¼"	16"	PB	1
E trough side (R)	¾"	17¼"	16¾"	PB	1
F* front and back	1½"	5½"	27"	B	2
G* sides	1½"	5½"	21¾"	B	2
H cleats	¾"	1¼"	22½"	P	2
I cleats (sides)	¾"	1¼"	14¾"	P	2
J door	¾"	12⅝"	24"	PB	1

Parts	Finished Size* T	W	L	Matl.	Qty.
WORKTOP					
K* panel	1½"	22½"	34½"	LPB	1
L side banding	¾"	1½"	22½"	B	2
M banding	¾"	1½"	36"	B	2
VACUUM CONNECTOR AND SWITCH BLOCK					
N* connector	¾"	4" diameter		PB	2
O switch block	1½"	4"	4½"	B	1
FENCES AND GUARD					
P base	¾"	5"	7"	PW	2
Q supports	¾"	2"	7"	PW	2
R guides	¾"	2"	16½"	B	2
S sides	¾"	2⅛"	8¼"	B	2
T back	¾"	2⅛"	4¼"	B	1

*Initially cut parts marked with an * oversized. Trim them to finished size according to the how-to instructions.

Material Key: PB-particleboard, P-pine, LPB-laminated particleboard, B-birch, PW-plywood.

Supplies: #8×1" flathead wood screws, #8×1¼" flathead wood screws, #8×1¾" flathead wood screws, #8×3" flathead wood screws, #10×½" flathead wood screws, ¾" drywall screws, 1¼" drywall screws, ¼×2" roundhead machine screws, 1 1/16" continuous hinge 24" long, panel adhesive, 90° street elbow (for 3" PVC pipe), 45° street elbow (for 3" PVC pipe), 3" PVC pipe 2' long, quick-set epoxy, 2 pieces of 25×37" plastic laminate, contact cement, four pieces of ¼" all-thread rod 4⅛" long, 4 knobs (Delta part no. 1087524, used on their miter gauge), ¼" wing nuts, ¼" flat washers, 14 ¼" T-nuts, nylon pull (handle), 2 magnetic catches and plates. ¼×5×11¾" clear acrylic, 3½x3½" square corner hinge (Stanley part no. 741), ¼×20 carriage bolt 2" long, ¼" steel rod 2½" long, filler, sanding sealer, paint.

and the cabinet as shown in the photo at *left*. (We used panel adhesive to caulk the joints.)

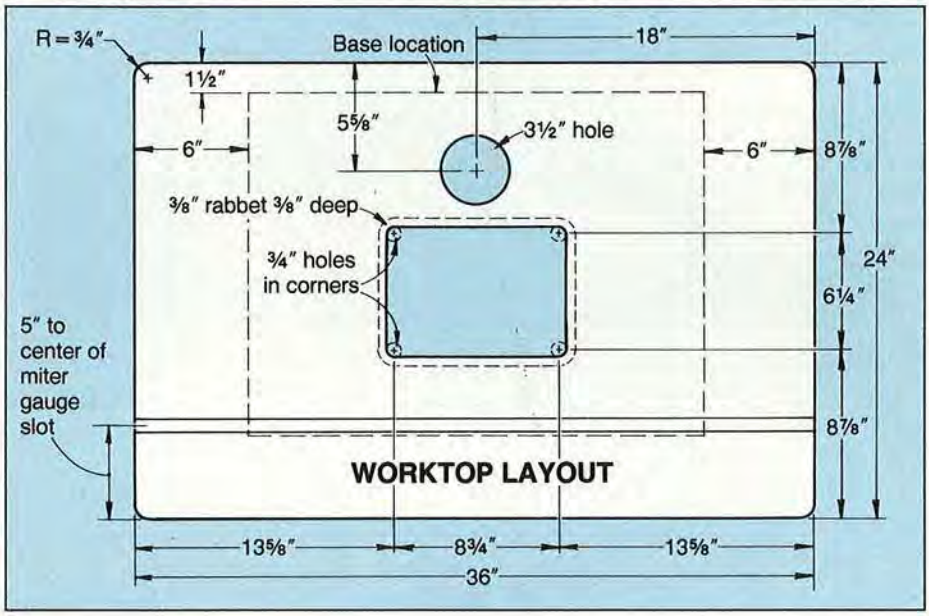
8 Cut the cleats (H, I) to size. Drill the mounting holes, and glue and screw the cleats in place.

9 Cut the door (J) to size. Cut a 1⅛" continuous hinge to 24" long, and fasten it to the bottom of the door and then to the top edge of the front panel (C).

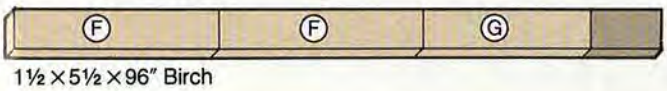
10 Cut a notch for the power cord below the front cleat (H) where shown on the drawing *far left*.

NEXT, ADD THE WORKTOP

1 Cut two pieces of ¾" particleboard to 23×35" for the worktop panel (K). Glue and clamp together the pieces with the edges flush. Trim all four edges of the panel for a 22½x34½" finished size.

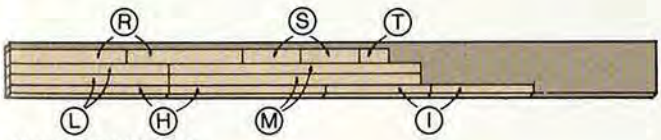


Cutting Diagram

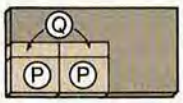


1½×5½×96" Birch

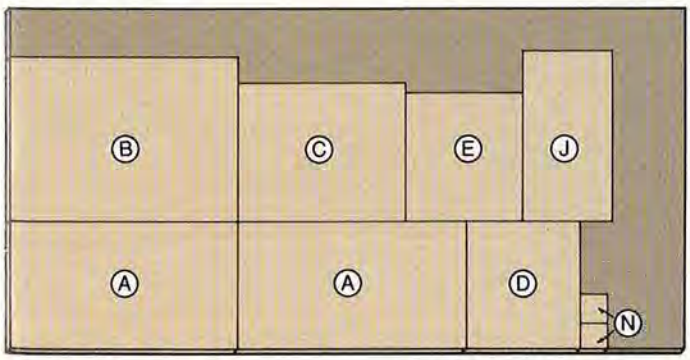
1½×5½×36" Birch



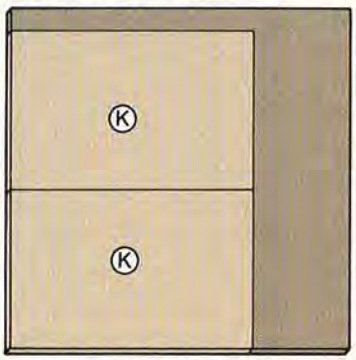
¾×7¼×96" Birch



¾×12×24" Plywood



¾×48×96" Particleboard



¾×48×48" Particleboard

2 From ¾" birch stock, cut the banding pieces (L, M) to length. Glue and clamp the banding pieces to the laminated panel (K). With a compass, mark a ¾" radius at each corner and cut to shape.

3 Cut two pieces of plastic laminate to 25×37". Using contact cement, adhere one of the plastic-laminate pieces to the top of the worktop. With a flush-trimming bit, rout the edges of the laminate flush with the outside edge of the worktop. Repeat the process with the bottom piece. Rout a ⅛" chamfer along the top and bottom of the worktop where shown on the Exploded-View Drawing.

4 To form the opening for the router plate, mark the centerpoints for four ¾" holes where shown on the Worktop Layout Drawing. Bore the holes. Mark lines connecting the perimeters of the holes, and use a jigsaw to cut the opening to shape. Sand the opening smooth.

5 Rout a ⅜" rabbet ⅜" deep along the top inside edge of the opening. The top of the router plate should sit flush with the top of the worktop where shown on the Chamfer Detail on the opposite page.

6 To provide additional clearance for installing and removing the router from the worktop, rout a 1" chamfer along the bottom of the opening where shown in the Chamfer Detail on the opposite page. (To maneuver the Ryobi router through the opening, start by turning the height-adjustment knob to lower the router as far from the acrylic plate as possible. Then, you'll need to angle the router slightly and wiggle it through the worktop opening.)

7 Mark the location and cut the 3½"-diameter vacuum hole to size in the worktop.

MOUNT THE WORKTOP AND ROUT THE SLOT

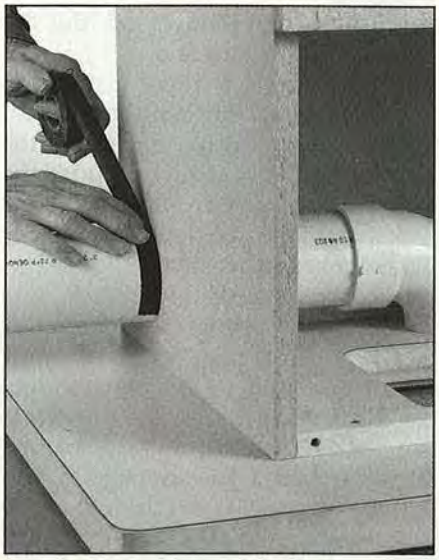
1 Center and screw the worktop to the base where indicated on the Worktop Layout Drawing *above left*.

Continued

2 Mark the miter-gauge slot location on the top of the worktop where dimensioned on the Worktop Layout Drawing. As shown in the photo at *right,* clamp a board to the top of the worktop to act as a straightedge. Then, rout a slot to fit your miter gauge.

HERE'S HOW TO INSTALL THE DUST PORTS

1 Position the 90° street elbow PVC pipe in the hole from the bottom of the worktop where shown in the photo *below.* Position the cabinet on its side. Utilizing the Section View Drawing at *right* for reference, drill two ⅛" pilot holes, and screw the 90° elbow in place.

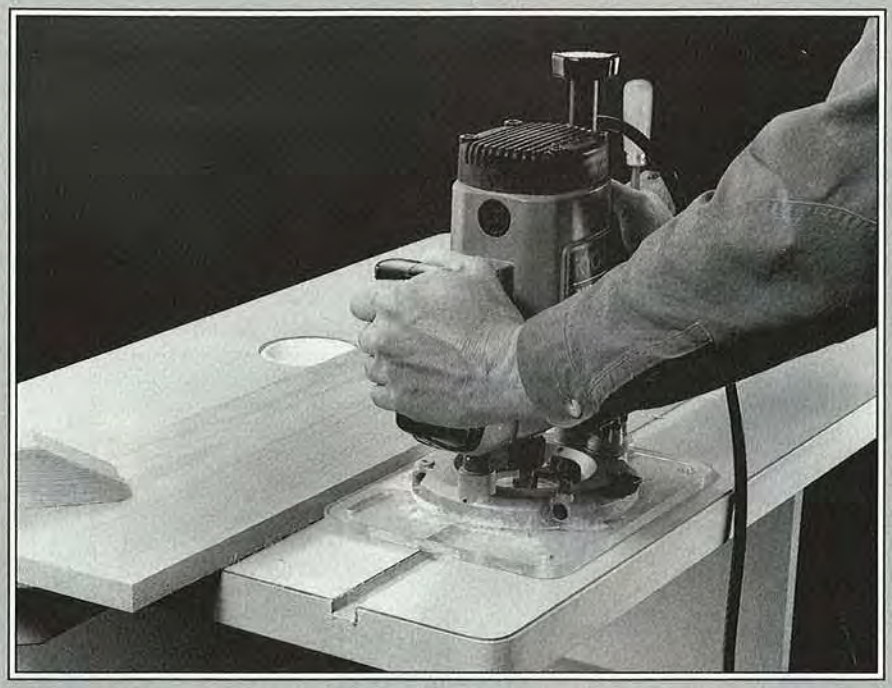


Insert the PVC pipe into the elbow, and mark the cutoff location with tape.

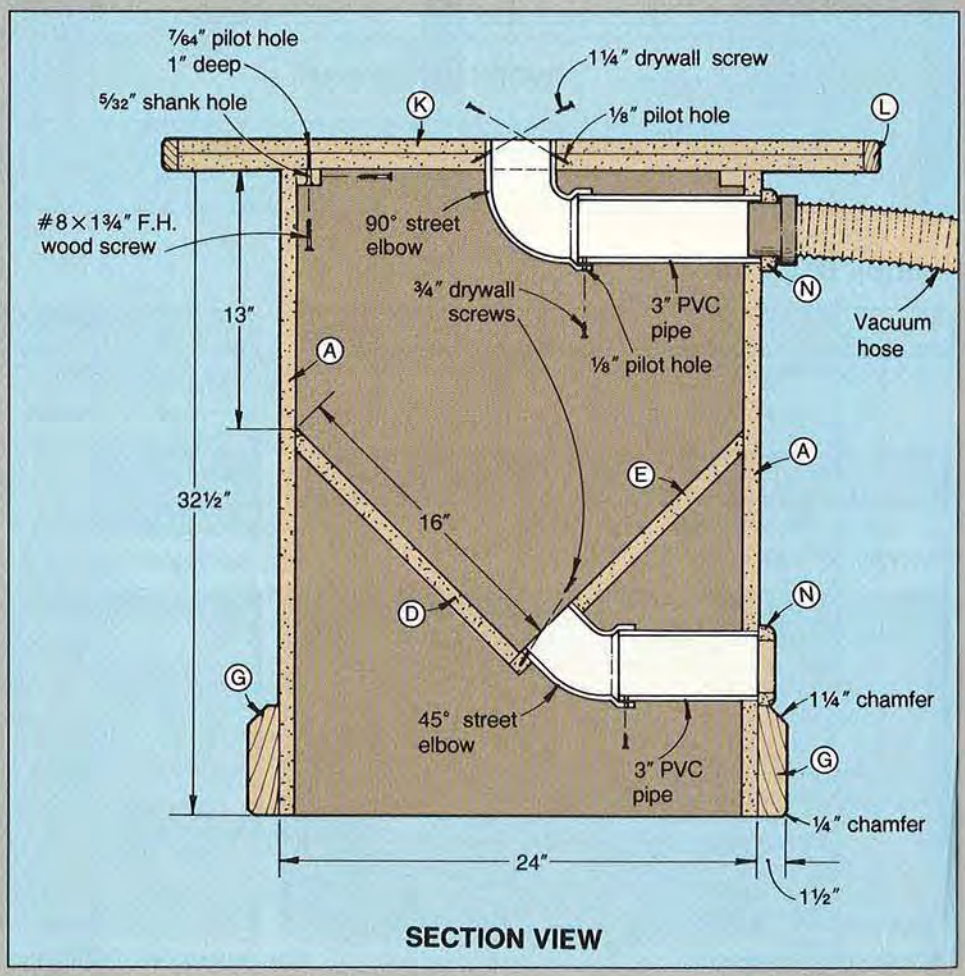
2 Turn the cabinet upside down. Now, stick a 24" length of 3" PVC pipe through the top inlet hole and into the street elbow where shown in the photo. Mark the pipe length by wrapping tape around the pipe flush with the outside surface of the cabinet side. Remove the pipe.

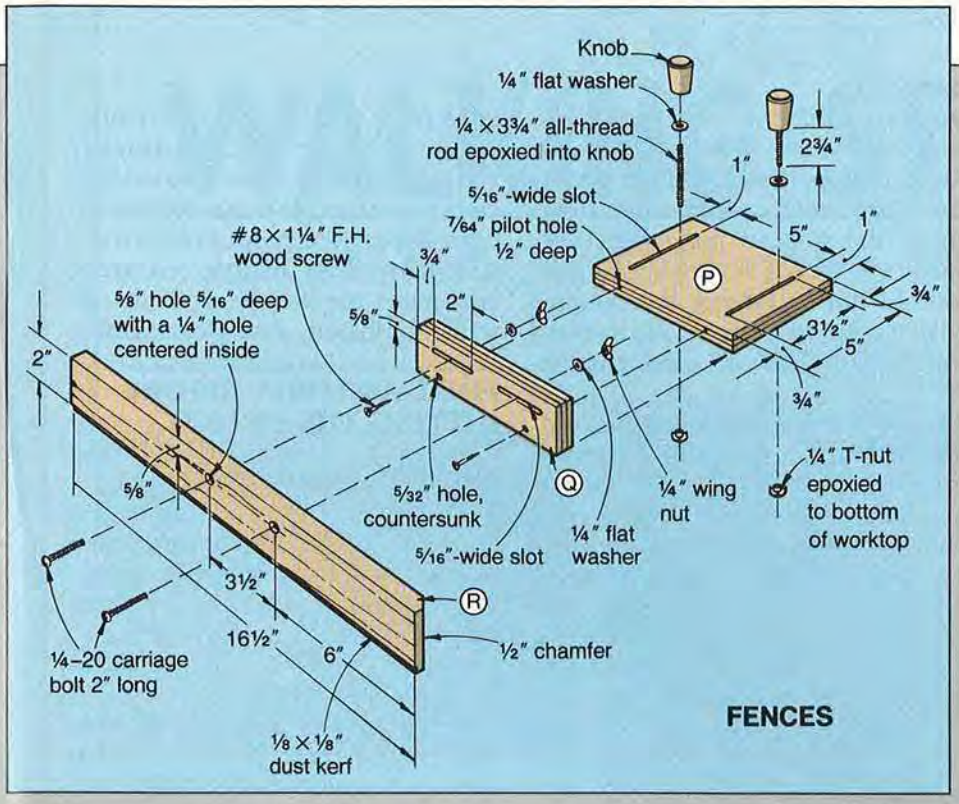
3 With a hacksaw, trim the 3" PVC pipe to length, cutting at the tape line. Drill a pilot hole and fasten the straight piece of pipe to the 90° street elbow. Remove the tape.

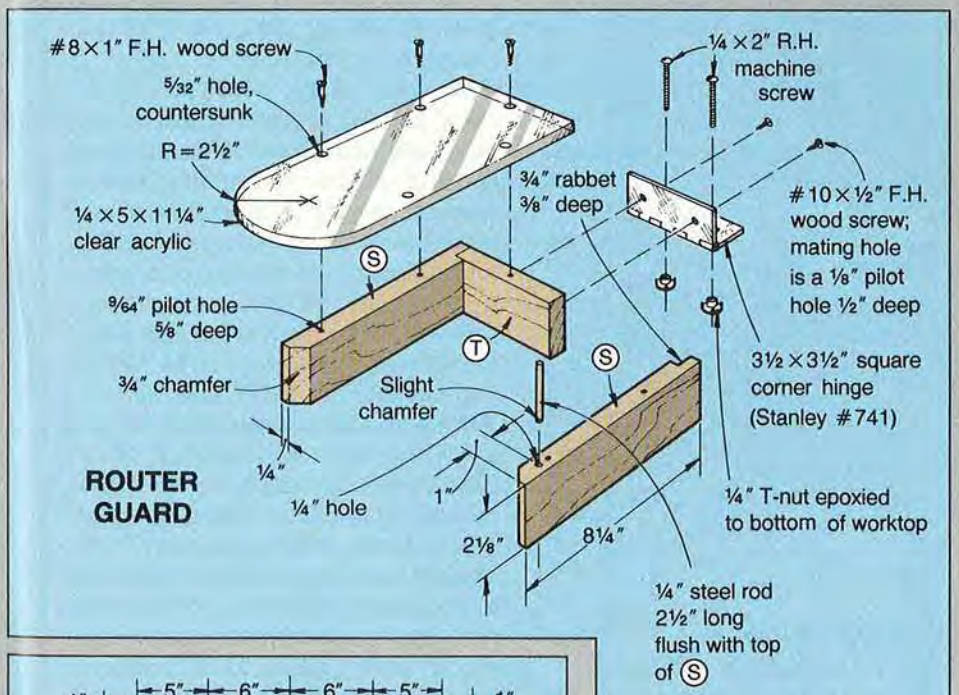
4 Repeat the procedure above to attach the lower 45° street elbow and 3" PVC pipe.

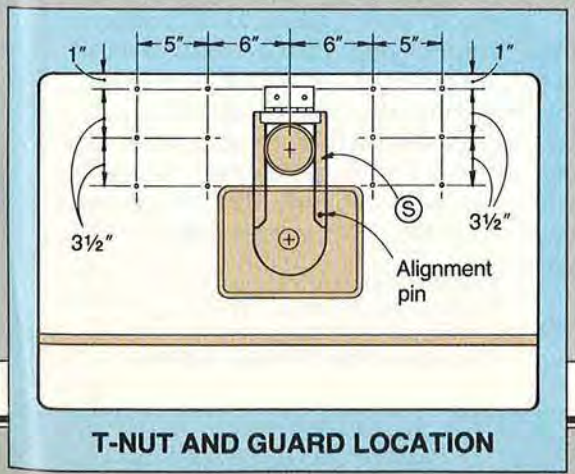


Rout a miter-gauge groove in the worktop.






#8 × 1" F.H. wood screw
5/32" hole, countersunk
R = 2½"
¼ × 5 × 11¼" clear acrylic
¼ × 2" R.H. machine screw
¾" rabbet ⅜" deep
#10 × ½" F.H. wood screw; mating hole is a ⅛" pilot hole ½" deep
9/64" pilot hole ⅝" deep
¾" chamfer
Slight chamfer
3½ × 3½" square corner hinge (Stanley #741)
¼"
¼" hole
1"
2⅛"
8¼"
¼" T-nut epoxied to bottom of worktop
¼" steel rod 2½" long flush with top of S
S
T
ROUTER GUARD



ADD THE VACUUM CONNECTORS AND SWITCH BLOCK

1 Cut two 4" squares from ¾" particleboard for the vacuum-hose connectors (N). Mark diagonal lines on each square to find center.

2 Measure the outside diameter of your vacuum hose (we measured ours at 2½" with an outside calipers). Using a compass, center and transfer the hole location to the connector blank. Mark a second circle ¾" on the outside of the first.

3 Drill a blade start hole and cut just inside the marked inner circle (the same diameter as your vacuum hose). Check the fit of the hose in the hole; it should fit snugly. Cut the outside circle to shape on the bandsaw and sand smooth.

4 Rout a ⅜" round-over along the top outside edge of each connector. Sand the connectors and glue and clamp each to the cabinet, centered over the previously cut holes.

5 Cut the switch block (O) to size. With #8 × 2½" F.H. wood screws, glue and screw the block to the cabinet side (A) 6¾" from the front edge of the worktop.

SPLIT FENCES PLAY A SUPPORTING ROLE

1 Cut fence base pieces (P), supports (Q) from ¾" plywood (we used birch plywood). Cut the guides (R) to size from birch stock. Cut a ⅛ × ⅛" dust kerf along the bottom front edge of each guide.

2 Mark the slot locations on the base and support pieces, using the Fences Drawing for reference. Drill a 5/16" hole at each end of each marked slot. With a jigsaw or scrollsaw, cut along the marked lines to form the slots.

3 Mark the centerpoints, and drill a pair of ¼" holes in each guide. Counterbore a ⅝" hole 5/16" deep centered over each ¼" hole on the front face of each guide.

4 With the bottom surfaces and ends of the supports (Q) and bases (P) flush, drill the holes, and glue and screw together each assembly. Check that Q is square to P.

Continued

5 With a hacksaw, cut four pieces of ¼" all-thread rod to 3¾" long. Epoxy and thread a knob onto one end of each threaded rod (see the Buying Guide for our source).

GUARDING AGAINST EYE INJURY

1 Cut the guard sides (S) and back (T) to size. Cut a ¾" chamfer along the front inside edge of each side piece where dimensioned on the Guard Drawing. Cut or rout a ¾" rabbet ⅜" deep along the back inside edge of each side piece (S).

2 Glue and clamp the back piece between the side pieces. Attach the hinge to the back (T).

3 Position the router plate with attached router into the routed opening in the worktop.

4 Clamp the guard over the vacuum hole where shown on the T-Nut and Guard Location Drawing. Using the two outside hinge holes as guides, drill a pair of ¼" holes through the worktop.

5 With the guard clamped in place, drill a ¼" hole through the right-hand guard side (S) and through the router plate. Cut a piece of ¼" steel rod 2½" long. Grind or file a slight chamfer on the bottom end of the rod. Epoxy the rod into the hole in the guard side so ⅜" of the rod (the chamfered end) protrudes down into the hole in router plate. Do not epoxy the rod to the plate. The rod prevents the guard from moving when stock is pushed against the guard. Remove the guard from the worktop.

6 Cut the clear acrylic top to the shape shown on the Guard Drawing. (We used ¼" acrylic and cut it to shape with a bandsaw. See the Buying Guide for a source if you don't want to cut your own.)

7 At a speed of about 250 rpm, drill the mounting holes and screw the acrylic to the guard assembly.

DRILL THE HOLES AND ADD THE T-NUTS

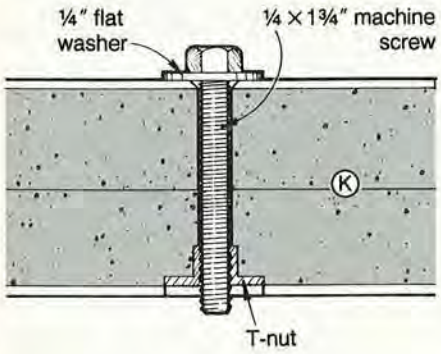
1 Remove the 90° elbow from the worktop, and remove the worktop from the cabinet. On the top of the worktop, mark the T-nut hole centerpoints where shown on the T-Nut Location Drawing. Check that the T-nut hole centerpoints align under the slots in the fence base parts (P). With a ¼" brad-point bit, drill 12 holes, backing the bottom with scrap to prevent chip-out. Switch to a 17/64" bit, and enlarge the ¼" holes.

2 Countersink the holes on the top side. See the Chamfer Detail accompanying the Exploded-View Drawing for reference.

3 Turn the worktop bottom side up. Counterbore 5/16" holes ⅜" deep centered over each 17/64" hole. See the Chamfer Detail for specifics.

4 Insert a ¼" T-nut into each counterbore. Trace around the perimeter of each T-nut. With a spade bit, drill a ¾" hole ¼" deep where traced to house the T-nut head.

5 Being careful not to get any epoxy on the interior threaded portion, epoxy each T-nut in place on the bottom side of the worktop. (Use the set-up shown *below* to position each T-nut squarely until the epoxy cures.)



HOW TO APPLY A GREAT-LOOKING FINISH

1 Fill the voids and edges of the particleboard. (We used Durham's Rock Hard Putty.) Sand the cabinet, especially the edges, smooth.

2 Remove all the hardware and mask the laminate top and bottom of the worktop. Next, apply a coat of lacquer sanding sealer to the cabinet, and guard.

3 Spray on a medium coat (no runs) of Rust-Oleum's regal red gloss paint and allow it to dry until tacky. Then, spray on a thicker coat. The tacky coat provides a sticky surface for the follow-up coat. Repeat the procedure twice.

4 Finally, mask mating red areas, and paint the inside with an off-white, oil-based, semi-gloss enamel.

FINAL ASSEMBLY BEFORE HITTING THE SWITCH

1 Fasten the worktop to the cabinet. Install the PVC pipe fixtures.

2 Drill the holes, and attach the door pull. Next, fasten the strike plates to the back of the door and the magnetic catches to the front cleat (H). Attach the switch.

BUYING GUIDE

- **Router.** Ryobi RE600 3hp, variable speed, plunge router with depth-adjustment knob. $199 ppd. Seven Corners Ace Hardware, 216 West 7th St., St. Paul, MN 55102. Or call 800-328-0457.
- **Router plate.** ⅜ × 7¾ × 10¼" clear acrylic insert, radiused corners, and chamfered edges, catalog no. 102. If your router uses metric screws, specify router brand and model for a set of extra-long screws for mounting router to plate. $16 ppd. (add $2 for extra-long screws). Woodhaven, 5323 West Kimberly Rd., Davenport, IA 52806. Or, call 800-344-6657 to order.
- **Height-adjustment knob.** Knobs available for the Makita 3612, Bosch 1611 and 1611VS, the Hitachi TR12, and Elu 3338. $20 ppd. Woodhaven, address above.
- **Hardware kit.** 4 knobs (similar to those shown) with ¼" threaded rod glued in place, 16 ¼" T-nuts, nylon pull (handle). 2 magnetic catches and plates, ¼x4½ × 11¼" acrylic for guard. $32.50 ppd. Woodhaven, address above.
- **Power switch.** Catalog no. A526, $16.55 ppd. AMT, P.O. Box 70, Royersford, PA, 19468 or call 215/948-0400 to order.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Jim Kascoutas; Bob Calmer
Illustrations: Kim Downing; Bill Zaun

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IN PRAISE OF WALKING STICKS

ENGLISH STICKMAKER THEO FOSSEL REVIVES A CRAFT AS BRITISH AS THE UNION JACK

Theo Fossel seemingly stares down the duck head adorning one of his walking sticks.

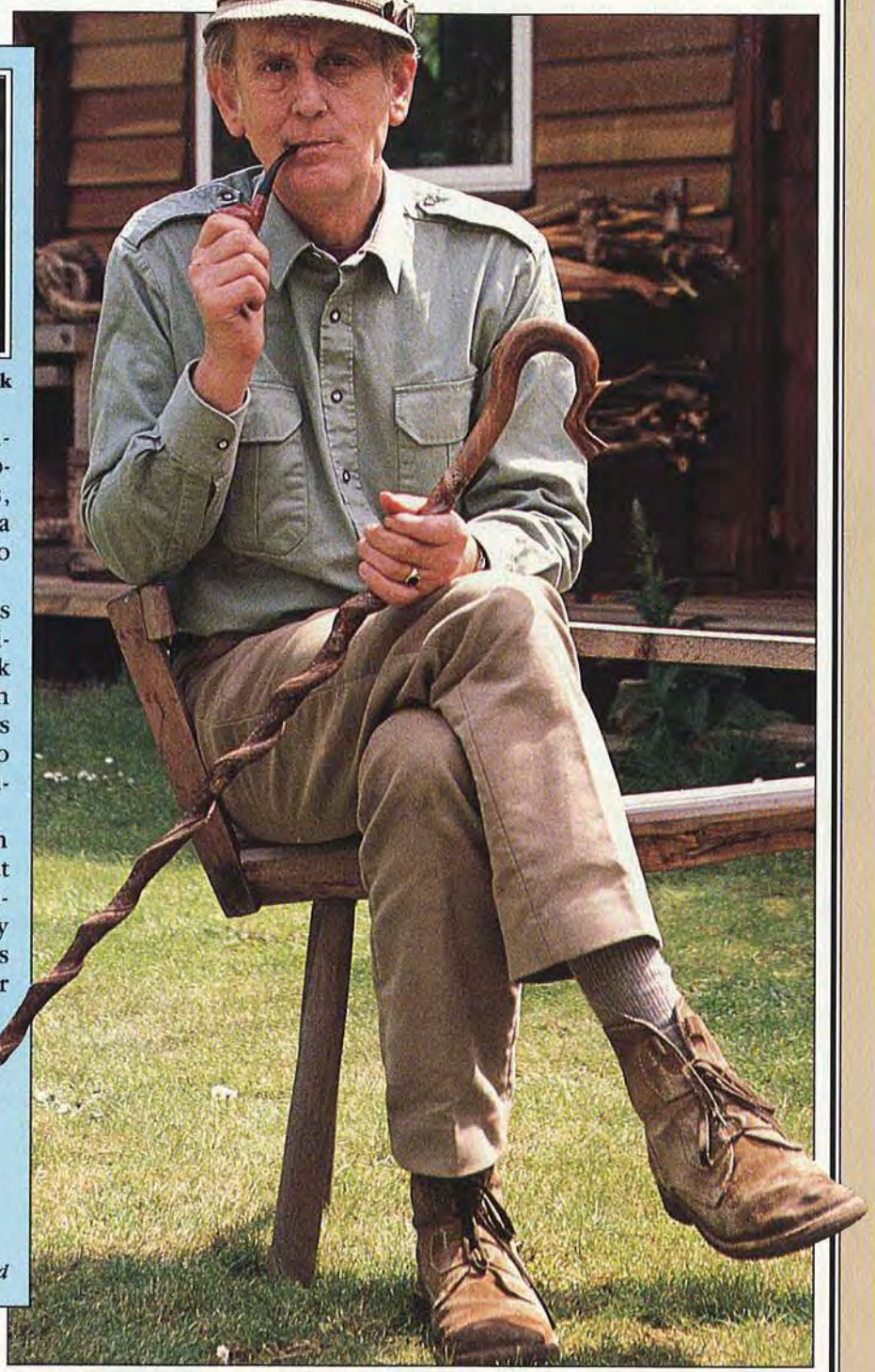
Walking sticks—once as commonplace in England as cobblestones and crumpets, thatched roofs and teatime—have made a comeback in the British Isles. And, Theo Fossel, stickmaker, couldn't be happier.

Theo, 53, shown *right*, has turned his stickmaking hobby into a profitable business, and not only sells his work throughout Britain, Europe, and North America, but furnishes other stickmakers with a complete line of supplies. He also has become chief advocate for the centuries-old craft.

In 1984, Theo founded the British Stickmakers Guild, an organization that now numbers more than 1,000 members. He also shares his knowledge by teaching at seminars. In addition, he's produced a video on the subject (for more information, see page 61).

We couldn't help getting excited about stickmaking after listening to Theo—there's just something doggone interesting about it. Following our visit with him, we believe there are going to be a lot more stickmakers on both sides of the Atlantic.

Continued



Twisted sweet chestnut sets off the long market stick Theo holds.

"A stick makes a jolly good companion. Carrying one on a jaunt makes you part of the countryside. Besides, it can keep all sorts of dogs at bay—and it doesn't talk back."

Theo Fossel not only believes his words, he lives them. From his country shop an hour's drive from London in Beaconsfield, Buckinghamshire, have come thousands of walking sticks, each destined for someone like Theo—dedicated to reviving the days when walking was a pleasurable pastime.

"It was the motor car that displaced the walking stick," claims Theo, sharply slapping one of them into his palm. "People not only gave up walking so much, but where could they cram a 3′ stick in an Austin? Now, though, times have changed again. People *are* walking more."

TWO LEGS AND A STICK

Theo believes it's human nature to carry a stick. In fact, he contends that that's how man first pushed himself upright to walk. Of course, the walking stick was carried along in man's evolution, and became highly specialized. Walking sticks developed into works of art as well as necessary items of apparel.

"*Walking sticks* commonly measure about 36″ long and do not vary tremendously from ¾″ diameter along the length," Theo explains. "They're usually of wood, and can have a self-handle, an attached handle of carved wood, or a handle of horn or antler."

Canes, on the other hand, have an altogether different look. "The word 'cane' at one time described the material. Canes *were* made from cane," Theo notes. "Now, the word simply means a type of shorter, thinner, tapered, and most often elegant, turned stick worn with evening clothes. That is, in Britain."

That definition cleared up, Theo launches into a description of other types of sticks. "Four feet or taller, thumbsticks act as a third leg and point of balance. They quite traditionally have a carved ledge on which to rest the thumb," he says. "We then have hiking staffs, wading poles, shooting sticks, and other specialty types, including the 'tipple' stick that contains a flask.

"Working sticks (48″), such as relied on by shepherds, have crooks rather than handles, their shape decided by the purpose—neck crooks, leg cleeks, and market sticks," says Theo. (See examples in photographs *below.*) Plainly, a stickmaker has no lack of variety to offer as his product.

HARVESTING FROM HEATH AND HEDGEROW

Time spent studying forestry in his native Austria—and his stickmaking—have cast Theo as a walking, talking reference of tree and plant life. He just may be the world's greatest living font of knowledge regarding the raw material for walking sticks.

"Britain has a vast number of native woods applicable to stickmaking, and I dare say, as I travel to the U.S. and elsewhere, I find others equally attractive," observes the gangly craftsman. "But, as a guide, I can say that generally all conifers, willows, poplars, alders, and other light timbers are not heavy enough when seasoned to be suitable for walking sticks. They also have nothing in their bark to recommend them [for eye appeal]."

Theo's choice of woods? "For sticks, the most common English woods are ash, hazel, sweet chestnut, and blackthorn," he replies. "Hazel has the distinction of possessing a shimmering, nearly metallic-looking bark that must be left on. Ash is stout, yet elastic, and has a particularly decorative figure that stains nicely. Sweet chestnut, with the bark left on and stained, becomes very black. By scarring the stick along its length while still growing," Theo continues, "the scar tissue formed gives it a knobby look that is called 'Congo pearl.'

"But, without doubt, my favorite stick is blackthorn. It grows throughout the British Isles. The knobs on it come from the thorns, which grow clear through to the center. Although the Irish prefer the bark stained black, I leave it the natural deep red color and coat it with varnish."

Theo's trips to North America (to Shreveport, Louisiana, where he demonstrates his craft at the Red River Revel each October, and to Canada) have introduced him to likely North American materials. "In the South, I've gathered shanks of crepe myrtle, sweet gum, water privet, and a shrub appropriately called devil's-walkingstick," he says. "Although I've not frequented all the hedges and timber of the North, I know that birch and cherry will work bark-on [cherry approximates blackthorn in appearance]. Dia-

A toe-out market handle hand-carved from hornbeam

Walnut leg crook with acorn

mond willow, and the straight shoots of apple, plum, and other fruit trees will do as well. There are no doubt others. Remember, in stickmaking, you lose nothing by trying something."

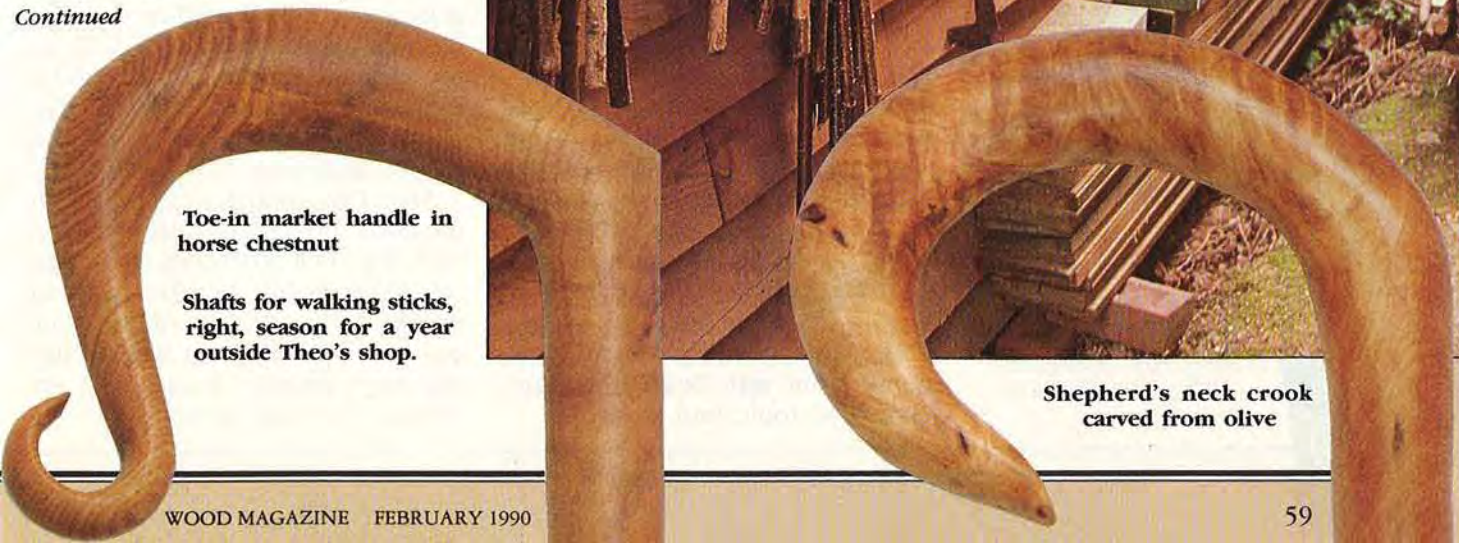
In England's temperate climate, the stickmaker gathers small-diameter shanks from nearby hedgerows and woodlands from December through February, "when the sap is down." On his harvests, Theo carries a folding pruning saw to fell his finds, pruning clippers to remove side shoots, a small trowel to unearth what could be a self-handle, a short sheath knife, and a ball of twine for bundling up the cut sticks. Theo protects himself from barbs and thorns with a heavy leather glove on the cutting hand, protective glasses, and a close-fitting hat. And, carrying along a 40" stick prevents cutting too short.

A KNEEFUL OF STICK STRAIGHTENING

Theo's newly gathered sticks season for a year, outside under shelter, standing on end in tied-up bundles. "I never seal the ends. It's faster to lop off the stick a few inches long and remove the checked ends later," he advises. To prevent splitting, he also leaves the bark intact.

After seasoning comes straightening, for no matter how true nature formed the shaft, nothing but perfection will do for Theo's walking sticks. "There's no need to get fancy for steam-bending," he says. "An electric kettle and a rack clamped to my Workmate do nicely."

Continued



Toe-in market handle in horse chestnut

Shafts for walking sticks, right, season for a year outside Theo's shop.

Shepherd's neck crook carved from olive

For more information on this subject, order *Stickmaking and Carving*, a 60-minute video produced by and featuring Theo Fossel. Made in England, the video covers all aspects of the craft, as well as "stick dressing," the art of shaping ram's horn for stick handles. It's available in the U.S. for $53 ppd., from *Theo Fossel, Dept. W, P.O. Box 5775, Shreveport, LA 71135-5775.*

Steaming sticks for straightening requires only water, a teapot, a rack, a good eye, and a strong knee.

You can make this walnut duck-head handle from the kit shown, next page.

To straighten a stick, Theo wraps a section—usually beginning with the middle—in a towel to retain heat and moisture. He then positions it over the steam for about 10 minutes. After steaming, the section must be cooled. "When all parts of a shank have been steamed and cooled," Theo says, "I flex it over my knee slightly beyond the point I wish to set it—making for a sore knee after a spell! Then, I set it aside to dry."

Particularly stubborn sticks receive the vise treatment. Theo clamps them into his Workmate for a few hours, inserting corks at pressure points to avoid marring.

The straightened sticks eventually receive a finish. The country craftsman prefers an undercoat of boiled linseed oil followed by a topcoat of exterior or spar varnish on his sticks. "Linseed oil alone may be showerproof, but not waterproof," he notes. "Yet, the oil does give the varnish a better key [bite] into the wood."

Theo stains or fumes his bark-off sticks before finishing. "Fuming is done by first wiping on a solution made from bark and tea bags steeped together," he says. "Outdoors, I hang the saturated wood in a section of plastic gutter pipe held by support in the vertical position. Under the lower end, I place a container of ammonia. The upper end of the pipe I cover with a plastic bag. Warm weather greatly assists the ammonia to vaporize. But, it should only take a few hours to obtain a uniform color."

FITTING HANDLES FOR FINE SHAFTS

Some walking sticks that Theo crafts have self handles—either formed from a section of root that grew at a right angle to the shoot or steam-bent to shape. The most impressive handles, though, come from his carving knife. Fowl, fish, and animal heads come from ash, English walnut, elm, yew, apple, and plum.

Yet, Theo achieves simple elegance, too. Bandsawed to rough shape, then rounded with his carving knife and finely sanded, handles such as the Brighton crook, the Tam O'Shanter neck crook, round heel crook, and others look at home in town or country.

Carving walking stick handles requires few tools. Theo's bandsaw stands alone as a major investment. For most of the handwork on crook-type handles, he fits a hooked trimmer blade to an ordinary Stanley utility knife. Palm-sized V-gouges and shallow U-gouges in a few assorted sizes help out on ornate work. An assortment of padded sanding blocks and a bow-shaped strip sander carrying 60- and 120-grit garnet paper (as shown in photo, *next page*), some 600-grit wet-and-dry paper, and fine to extra-fine steel wool round out his basic equipment.

For a finish on his handles, Theo turns again to his boiled linseed oil. "I work it well into the wood with my palm," he says, "let it dry for a bit, then wipe off the excess. When it's thoroughly dry, I give the handle a coat of spar varnish."

Eventually, the stickmaker must join the handle and the shaft. "A traditional way is to trim the top of the stick to a dowel-and-shoulder, then glue it into a hole bored in the handle," says Theo. "However, I find that method not at all reliable." Instead, he joins the stick and handle with a piece of 7/16"-diameter, 5"-long threaded steel rod.

"Roughly one-third of the rod goes into a hole drilled in the handle and two-thirds into a hole in the shank," he says in describing the reinforced joint. "With epoxy on the threads, it makes a solid joining technique."

After Theo attaches the handle to the shaft, he measures the walking stick for final trimming to length. "On the average," he advises, "held upside down, the tip of the stick should reach the point where your hip joint projects [about 36" for people of average height]."

A Brighton crook handle of English walnut begins as a rough cutout. Theo favors utility-style knives for carving.

For contours, the stickmaker devised a bow sander, nothing more than a strip of sandpaper fastened to a bowed stick.

The stick measured and cut, Theo turns his attention to the business end—the part that touches the ground—to fit it with a brass ferrule. "A ferrule prevents rapid wear, and provides a good hold," he says. "Although many are made of steel, ivory, rubber, and horn, I prefer one that resembles a brass thimble. In Britain, they're available in diameters from ½" to 1".

Theo shapes the end of the stick with a knife so that it exactly fits the inside of the ferrule. He then taps the ferrule on until the stick fills the bottom of the cup. To hold it in place, he makes three dimples around its circumference with a nail or punch. "Three prevent it from working loose, as it would with only two," he says as he places the last sound tap on the punch with his battered hammer.

To neatly mate the handle to the stick diameter, Theo lightly shaves wood from it with his blade. At the ferrule end, he cleans up any bark or fibers raised during the installation. Where fresh wood reveals itself, he colors it with a felt-tipped pen of matching color. A final dab or two of varnish, and another walking stick—a new companion—comes into service.

SAY, WHY NOT HAVE A GO AT STICKMAKING?

Theo has worked with a U.S. warehouse to distribute his kit so you get everything you need to complete a traditional British walking stick from a shaft that you provide. But, if you prefer a made-in-England shaft, you can order that, too. Theo's basic kit (shown in photo, *above*) includes:

- English walnut duck-head carving blank bandsawed to shape;
- 1 SM knife handle;
- 3 SM knife blades;
- 1 Super knife (orange handle);
- 3 Super knife blades;
- Sanding pad, medium
- Fine sanding cloth for pad
- Epoxy glue pack
- 5/16" × 5" threaded steel pin
- Pair of glass eyes for duck head
- ¾" brass ferrule (as shown on the shafts in the photo)
- Complete carving and finishing instructions.

The you-furnish-the-shaft kit sells for $24.95 ppd. To order a bark-on, varnished hazel shaft from England, just like the one shown *top* in the photo *above*, add $12.

To order: Send check or money order to *Woodcraft Supply Corp., 210 Wood County Ind. Park, P.O. Box 1686, Parkersburg, WV 26102.* Allow 4–6 weeks for delivery.

Written by Peter J. Stephano
Photographs: Mike Pattison; Bob Calmer

SOMETHING NEW AND EXCITING ON THE HORIZON

SOUTHWEST

When she's not hiking or fishing in the mountains in her home state of New Mexico, Andrea Miller is busy in her woodshop, building projects to market at craft fairs in Santa Fe and Albuquerque. We were pleased when Andrea decided to share one of her biggest sellers, "Desert Magic," with us. Here's hoping you'll enjoy displaying this decorative accessory in your home.

***Note:** You'll need ½" stock for this project. You can either plane or resaw thicker stock to size or see the Buying Guide on the opposite page for our source. Also, if you'd like a full-sized pattern of the project pieces, see the box on the opposite page for ordering instructions.*

Print this article

MAKE SOME MOUNTAINS FOR YOURSELF

1 Cut five pieces of heavy paper to 8×14", and draw a 1" grid on each. Using the grid pattern at *right* for reference, lay out one landscape section on each piece of paper. To do this, mark the points where the pattern outline crosses each grid line. Draw lines to connect the points. Cut the patterns to shape. Repeat the process with a 3×10" piece of paper to form the template for the base pieces.

2 Position the paper templates on the specie of hardwood noted on the grid drawing, and trace the outline of each landscape section onto the stock. (We took a close look at our stock before tracing and chose the portion of the board with the most striking grain pattern.)

3 Bandsaw the five landscape sections (A through E) and the five base pieces (F) to shape. (We used a ⅛"-wide blade to cut the heavily contoured top edge of each landscape section to shape. Then, we switched to a ⅜"-wide blade to cut the curves along the bottom edge of each landscape section and to cut the base pieces to shape. The ⅜" blade ensures a smoother cut and less sanding later when fitting together the pieces.)

4 Transfer the full-sized cactus pattern to ⅛" walnut stock, and cut the cactus to shape.

ASSEMBLE AND APPLY FINISH BEFORE SUNSET

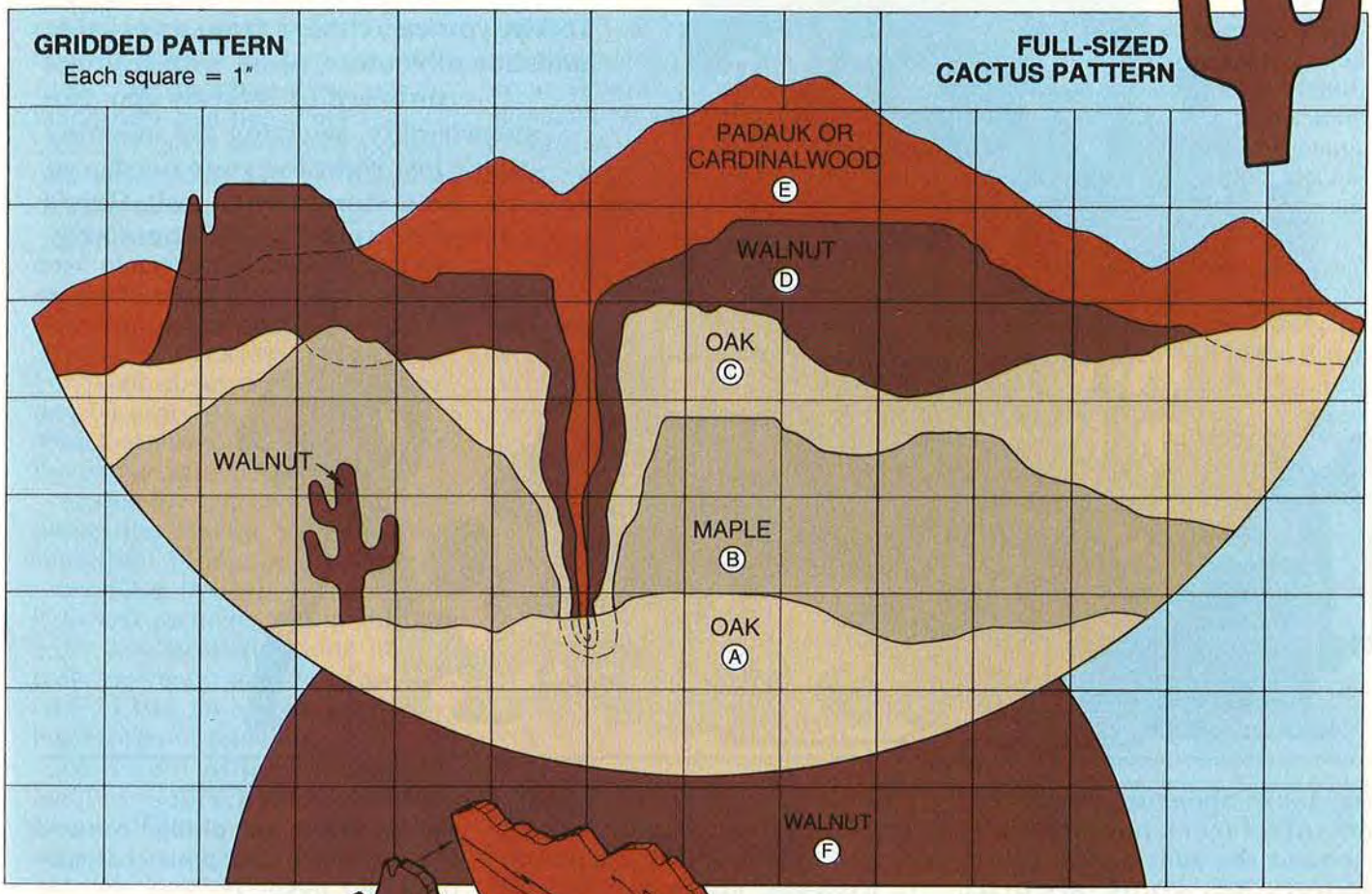
1 Finish-sand each piece. Glue and clamp together the five base pieces with the edges and ends flush. Glue and clamp together the landscape sections where shown on the gridded drawing. Wipe off squeeze-out with a damp cloth. (When gluing together the landscape sections, keep the glue about ½" away from the contoured top edge to eliminate hard-to-get-at squeeze-out.)

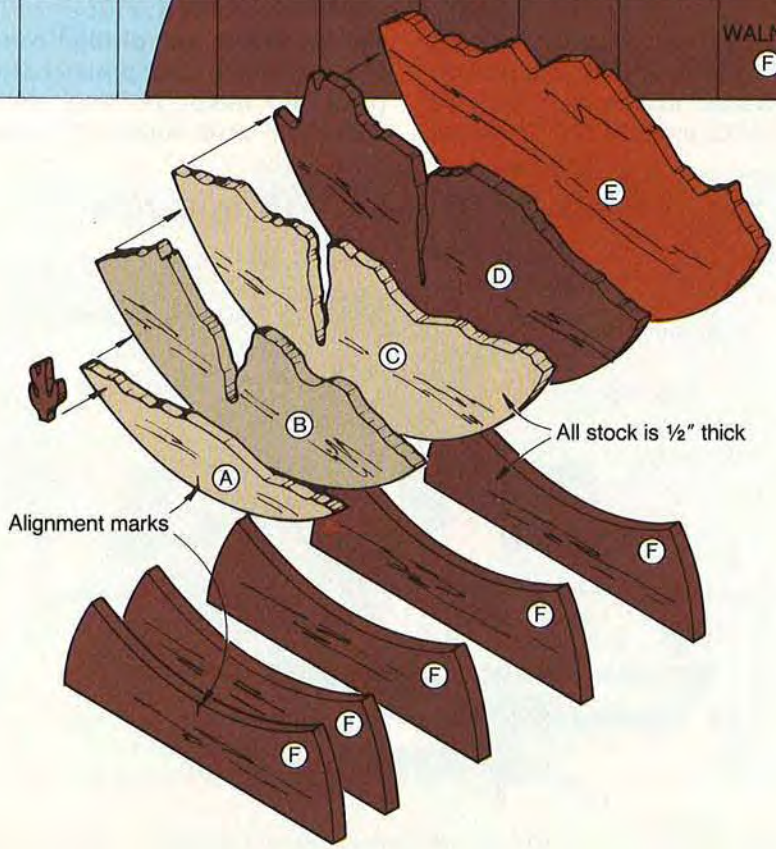
2 After the glue dries, check the fit of the bottom of the landscape scene against the top portion of the base. Sand the mating surfaces for a snug fit. (We used a drum sander to sand the top edge of the base, and a belt sander to sand the bottom edge of the scene. Sand until you have a gap-free fit.

3 Glue the scene to the base, wiping off excess glue with a damp cloth. Glue the cactus to the scene.

4 Finish-sand the assembly. Finally, apply the finish.

LANDSCAPE





BUYING GUIDE

● **½" stock.** Enough oak, maple, walnut, and padauk to make the project. Cat. no. 37DLK. $29.95 ppd. from Woodworker's Dream, 510 Sycamore St., Nazareth, PA 18064. Or, call 800-247-6931 (215/759-2837 in Pa.) to order.

Free PATTERN OFFER

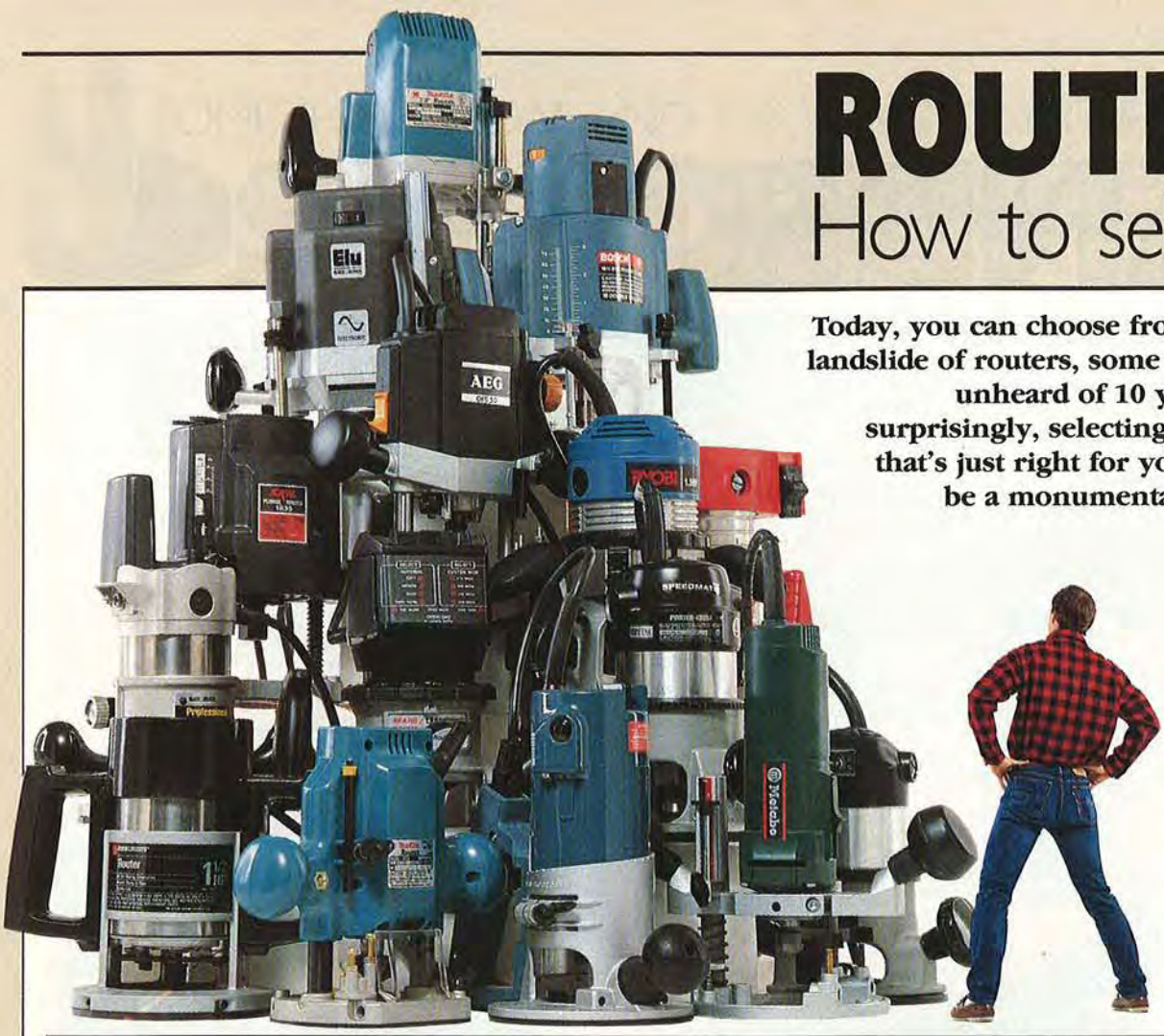
Full-sized landscape pattern. To order, send a self-addressed, stamped, No. 10 business envelope to:

Desert Landscape
WOOD Magazine
P.O. Box 11454
Des Moines, IA 50336-1454

Foreign residents: Please include an international reply coupon.
Offer expires August 15, 1990.

Project Design: Andrea Miller, Designs in Fabric and Wood, Albuquerque, N.M.
Photograph: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun

ROUTERS, How to select the



Today, you can choose from a veritable landslide of routers, some with features unheard of 10 years ago. Not surprisingly, selecting the machine that's just right for your needs can be a monumental task. Here's some help.

No doubt about it! Power-tool manufacturers have literally flooded the marketplace with routers. All kinds, all price ranges, and with a host of features from electronic variable-speed control to plunging mechanisms. Why all the options? Because woodworkers simply can't get enough of this versatile tool.

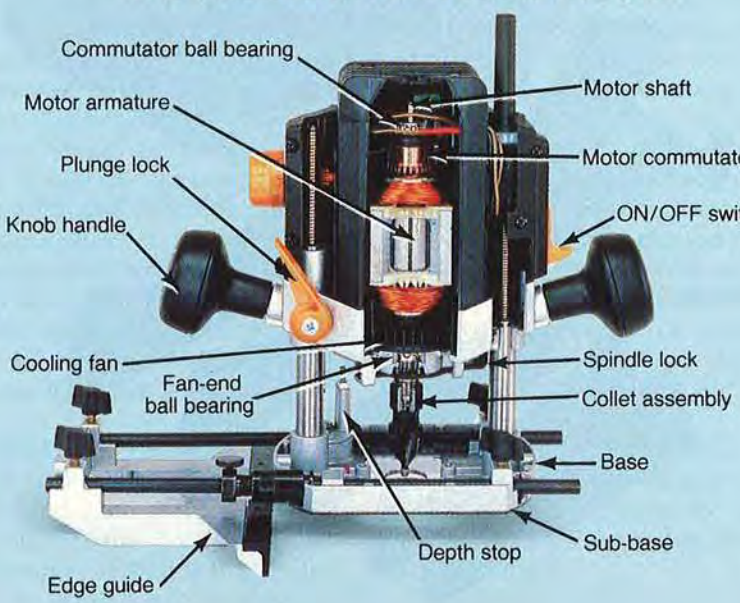
If you're in the market for your first router, or you're looking to upgrade or add one to your tool collection, then you've turned to the right article. Why? Because we spent two months probing, testing, and scrutinizing 22 routers from 14 manufacturers, and we found some big differences between what appear to be similar models. Here's what you need to know before putting down your money.

Print this article

DEPTH CONTROL: THE RISE OR FALL OF A ROUTER

Your first decision when buying a router: whether to choose a **plunge** or **fixed-base** machine. As typified by the AEG model OFS 50 router shown *below*, all plunge routers have spring-loaded posts that suspend the motor housing and bit above the work surface. To make a

THE INSIDE LOOK AT A PLUNGE ROUTER



ROUTERS EVERYWHERE
right model for your shop

cut, you first preset the bit depth, then plunge the bit into the work surface by pushing down on the machine's handles. This feature comes in handy for cuts in the field of a surface such as a joint mortise or inlay recess.

Three qualities distinguish a good plunge mechanism from a so-so apparatus:

- Smoothness of plunge motion.
- A solid locking mechanism (we'll talk about this important feature on page 70).
- Lack of side-to-side play (slop) in the plunge system.

Among the routers in the 2–3 hp range, the Makita 3612 had the smoothest plunge motion. There was no slop in the mechanism, and it locked securely, as did the Elu 3338 and the Porter-Cable plunge base shown on page 66. The AEG OFS 50 had the smoothest plunge mechanism of routers under 2 hp.

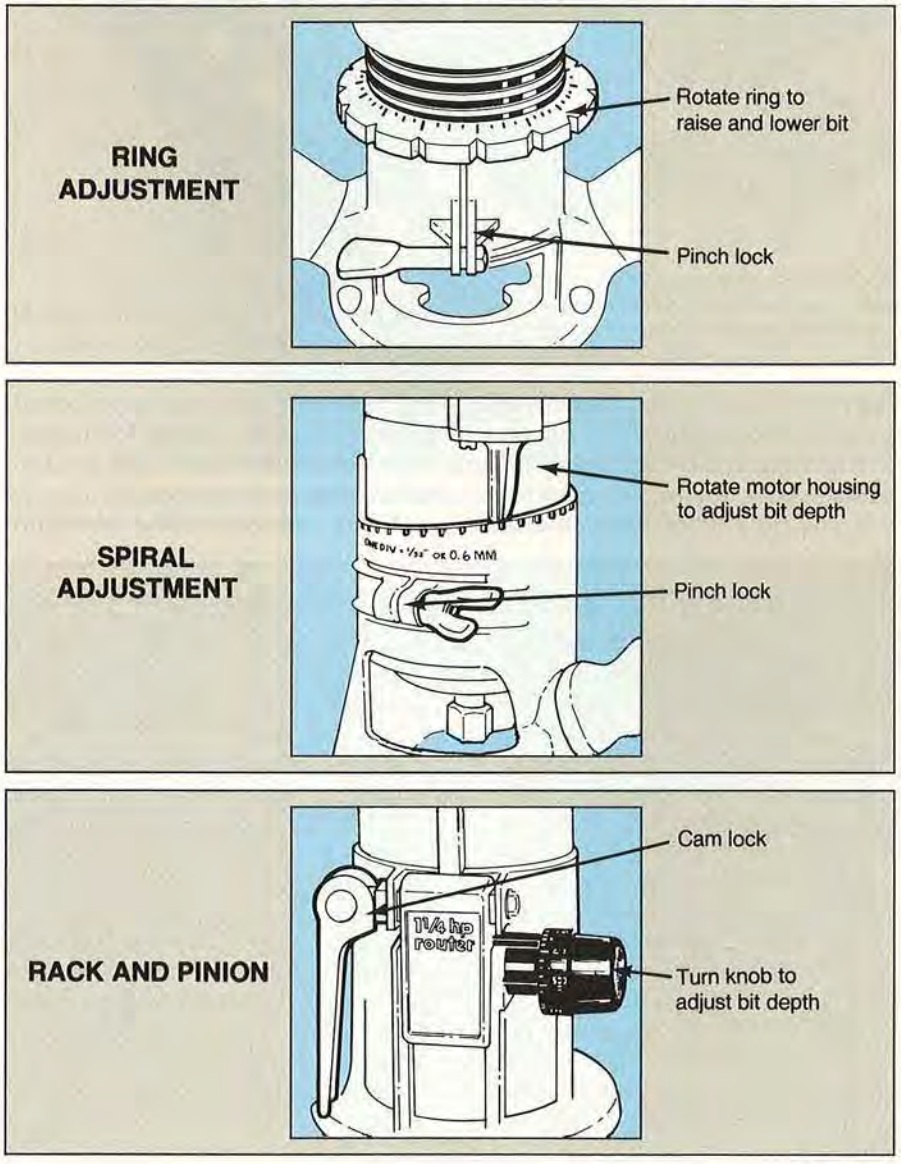
We found differences in the amount of slop among different routers of the same model, so we suggest you conduct the following test before making a purchase (especially if the machine sells for less than $200). First, firmly hold down the router base in one hand as shown *below*. With the plunge unlocked, try to move the top of the machine side to side. Test the router at several elevations—there shouldn't be any movement.

The Taiwanese-made Jepson 7412, *right*, looks like a Makita 3612, but had some slop in its plunge mechanism.

With fixed-base routers, you need to set the bit to the desired depth and lock it there before making a cut. These machines have three types of mechanisms for lowering the bit as shown in the drawings *below*. Of the three choices, we prefer the rack-and-pinion mechanism found on several of the Black & Decker machines including the model 7612 on the next page. We found this speedy depth-adjustment system just as accurate as the spiral and ring adjustments, but easier to use. The ring mechanisms required the most time to adjust of the three options.

SLOW-START, EVS, HP, AND OTHER POWER TALK

Once you make the plunge or fixed-base decision, you should



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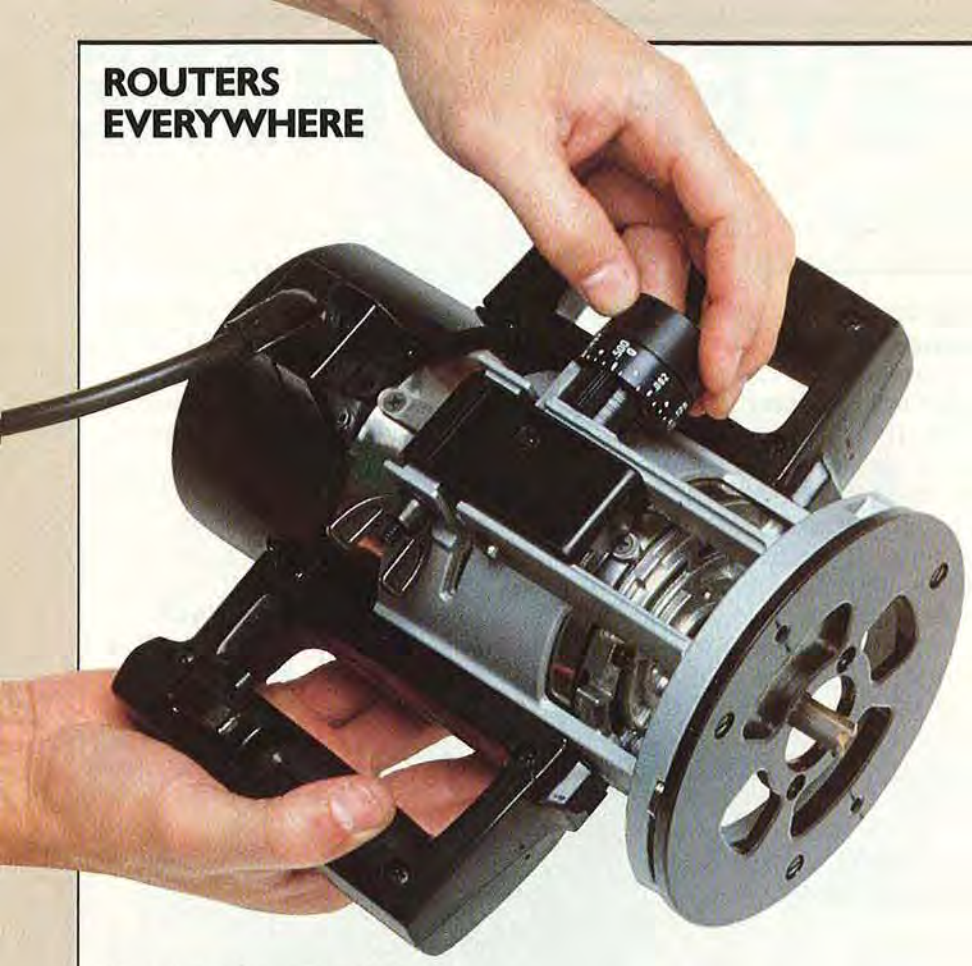


Black & Decker routers have rack & pinion depth adjustment—a desirable feature in our book.

determine how much power you need. For most of us, a 1–2 hp router will handle the majority of jobs. But, consider buying a 2–3 hp router if you do a lot of work in tough woods such as oak or hard maple with cove, rabbeting, or straight bits of 1½" or larger diameters. An overworked and underpowered router will chatter, slow down, produce poor-quality cuts, and put undue strain on the motor.

If you anticipate using bits with 1½" or larger diameters, such as those designed for making raised panels, then consider electronic variable speed (EVS)—a must-have feature. For both safety's sake and to prevent burning your workpiece, you must slow down these big bits. Both the Elu 3304 and 3338 slow to 8,000 rpm—the lowest speed of the EVS models we tested. Other models with EVS: Bosch 1611, Hitachi M12V, Ryobi RE-600, and Sears 27501.

All of these models incorporate slow-start circuitry that allows a router a second or so to come up to full speed. This feature nearly eliminates a router's jerking motion at start-up and extends the life of the machine's motor and bearings. We found Elu's slow start the smoothest, and Sears the roughest, but that's understandable since the Elu 3304 costs about $50 more than the Sears 27501.

COLLETS: AT THE HEART OF A ROUTER

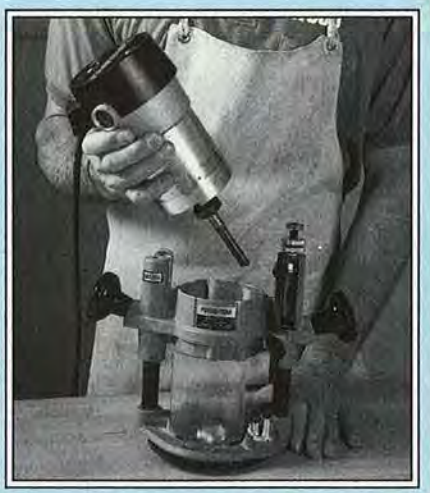
Because a collet serves as the vital link between the router and bit, its construction should weigh heavily in your router-buying decision. For advice on this gripping subject, we turned to Brad Witt. This Davenport, Iowa, native does router semi-

THE FIRST-EVER RETRO-FIT PLUNGE ROUTER BASE

We've often wondered when Porter-Cable would finally introduce a plunge router. When they did so recently, it came in a form that really surprised us—the first and only plunge base that retrofits to routers with 3½"-diameter motors. "With all the moving parts in a plunge router, we wanted to make sure we could maintain very tight tolerances in its mechanisms before introducing a unit," said Dennis Huntsman of Porter-Cable.

Indeed, we found that the model 6931 base shown at *right* maintains tight tolerances (such as its concentric alignment of the bit within the base's guide bushing). And, it does so in a sturdy, easy-to-handle package. One advantage of such a base: You need to own only one motor for router table or hand-held plunging work.

Will this new base fit the router(s) you already own? It will if you have any of the following: Porter-Cable or Rockwell models 100, 150, 350, 630, 670, 690 and 691 (PC sells the base with the 690 motor in its model 693 plunge router); Bosch 1601, 1602, 1603, 1604, and 1606; as well as the Black & Decker 2720. The base by itself lists for $120.



Porter-Cable's new plunge base retrofits to most 3½"-diameter motor housings (including non-PC machines).

nars around the country and owns a router accessories business, but he doesn't sell routers. "I pick a router for its collet, and I prefer a 3-piece collet, especially the self-releasing types found on some Makita, Elu, and Ryobi routers," Witt told us. These mechanisms have a ring-type spring that pops open the jaws of the collet as it's loosened. Although Witt says he loves the Bosch 1604 "for its ½" shank capability, good power, and price," he added that "the bit can stick in the collet occasionally."

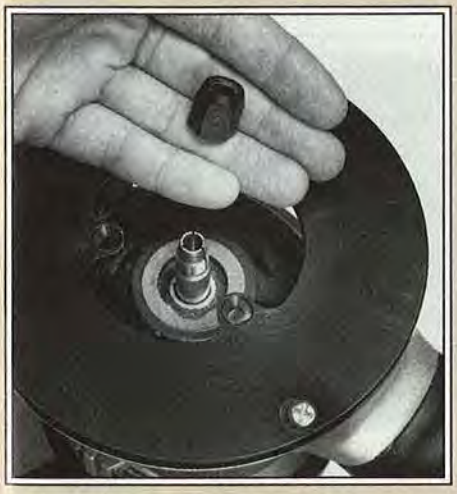
Witt's other advice: "Buy a router with a long collet. Most routers under $100 have short collets, and I don't know of one that's worth owning." Collets less than ¾" long can contribute to bit wobble, shearing of the bit's shaft, and even loosening of the bit while the router is operating.

Sears has a novel approach to this part of a router. A bored motor shaft with three slots down its side takes the place of a collet. Although this system makes for swift and easy bit changes, the long and narrow shaft often vibrates, something that makes the bit chatter as it munches through wood. Our advice: Buy a router with a sturdy collet if you're a heavy router user.

BALANCE AND HANDLES: STAYING IN CONTROL

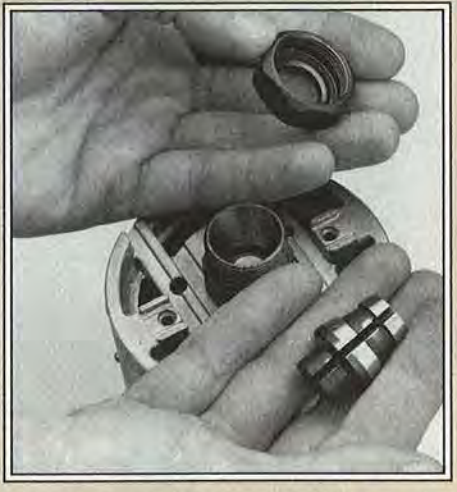
Anytime you hold a machine that spins a shaping edge at 20,000-plus rpm, you need control over that device to prevent an injury or a botched project. You'll especially appreciate added control in the large, 2–3 hp plunge routers that accommodate bits up to 3" in diameter. In this class, we consider arm-style handles such as those on the Ryobi RE-600 on page 70 essential for handling these heavyweights. We were disappointed to find that the Elu 3338 we tested had small, knob-like handles as shown *below*. When we last tested

We were disappointed with the small handles on the Elu 3338, an otherwise excellent machine. Black & Decker says larger handles are now available.



A bored motor shaft, split in three places, and capped off with a collet nut, holds bits in Sears routers.

Most routers under $100 have short collets such as this one on a Black & Decker model 7612.



The Porter-Cable model 690 has the longer, sturdier collets typical of heavy-duty routers.

Continued

plunge routers two years ago, Black & Decker officials said they planned to include larger handles on future models. Now, Dick Redpath of B&D says larger-handled models are on their way to dealers. You can retrofit the new handles to older model 3337's and 3338's.

Although it's often handy to have the extra horsepower of these larger units, their added weight and height make them harder to control than a 1–2 hp router. Among smaller plunge units, we felt the AEG OFS 50 handled best, thanks to its wide, low-slung construction and light weight (5½ pounds).

Fixed-base routers come equipped with different handles for different users and various tasks. If you like to rest your arms on the work surface as you move the router, then you'll appreciate the low knobs on models such as the Black & Decker 3310 and Bosch 1604 shown on page 70. You can buy the same model 1604 motor housing but with a D-handle (model 1606). The D-handle gives you better control when routing along edges.

THE BEST MODELS FOR A ROUTER TABLE

As we searched for the perfect router for a router table, a funny thing happened. We looked for a reasonably priced router with high hp and EVS (for large bits) that could be easily and accurately raised through the table surface. As we discovered, for less than $300, only the large plunge machines have 3 hp and EVS. But, most plunge mechanisms weren't designed for upside-down operation. Why? First, you have to exert a lot of upward pressure on the router to raise it, often requiring you to get down on your knees. Also, it's nearly impossible to accurately fine-adjust the height of the router. Fortunately, the Ryobi RE-600 and Freud FT2000 (shown at *left*) have fine height-adjustment knobs that allow you to elevate them with a turn of your hand when mounted in a router table. You can purchase retro-fit fine height-adjustment cranks for several other plunge routers through the Buying Guide on page 56.

Oh yes, the Porter-Cable model 518 fixed-base router will provide you with the ultimate in router-table routers. It has 3 hp, five speeds from 10,000 to 22,000 rpm, adjusts easily, and will probably last a lifetime, thanks to its all-metal housing and sturdy bearings. The only catch: a price tag of about $370.

If you feel that a 1–2 hp router will suit your power needs in a router table, we found that all of the fixed-base machines worked well mounted upside-down. Thanks again to their rack-and-pinion depth adjustments, the Black & Decker models were the most easily elevated routers in this group.

MORE BUYING POINTS TO CONSIDER

• **Switch accessibility:** For handheld routing, we favor handle-mounted trigger switches that allow you to keep a solid two-handed grip on the machine as you turn it on. Nearly as convenient, some routers such as the Ryobi RE-600 shown *below* have switches close enough to the handles that you can flip them on without losing your grip. If you table-mount a router, you'll find slide, rocker, and

Text continued on page 70

Fine height-adjustment knobs, such as the one on Freud's FT2000, make a snap of raising a table-mounted plunge router.

You can flip the ON/OFF switch on the Ryobi RE-600 while keeping a firm grip on both of its handles.

RELEVANT ROUTER RATINGS

MANUFACTURER/ IMPORTER	MODEL NO.	DEPTH ADJUSTMENT[1]	MAXIMUM PLUNGE DEPTH (INCHES)	ELECTRONIC VARIABLE SPEED (Y/N)	MOTOR				SWITCH TYPE[2]	PLUNGE-LOCK TYPE[3]	HANDLE TYPE[4]	BASE		ACCESS.[5]		HEIGHT (INCHES)	WEIGHT (POUNDS)	COUNTRY OF ORIGIN[6]	LIST PRICE	SELLING PRICE[7]
					NO-LOAD RPM	AMPS	HORSEPOWER	COLLET CAPACITIES (INCHES)				OUTSIDE DIAMETER (INCHES)	HOLE DIAMETER (INCHES)	STANDARD	OPTIONAL					
AEG	OFS 50	P	1 5/16	N	25,000	6.25	1	¼	TR	M	K	6⅛	1½	EG, HI	CCG, MC,VA	8⅞	5½	WG	$265	$235
Black & Decker	3310	RP	—	N	25,000	8	1½	¼,⅜	T	—	K	6	1¼	—	CG,LG, P,GB	7½	7¼	US	129	100
	7615	P	2	N	25,000	9	1½	¼	TR	M	A	6	1¼	—	CG,LG, P,GB	7¾	8¼	US	130	70
	7612	RP	—	N	25,000	9	1½	¼	TR	—	A	6	1¼	CC	CG,LG, P,GB	7¾	8	US	122	55
Bosch	1601	S	—	N	25,500	7	1	¼	T	—	K	6	1¾	—	EG,GB, VA	8	6¼	US	165	100
	1604	S	—	N	25,000	10	1¾	¼,⅜,½	T or T/TR	—	K or D	6	1¾	—	EG,GB, VA	8	7¾	US	243	120
	1611 EVS	P	3	Y*	12,000-18,000	15	3	¼,⅜,½	TR	S	A	6½	2⅝	HI	EG,GB, VA	13¾	12¼	US	410	255
Elu	3304	P	1 5/16	Y*	8,000-24,000	6.5	1	¼	S	T	K/A	5 11/16	2½	EG, HI	CG,GB, RG,VA	9 9/16	6	SW	261	180
	3338	P	2 7/16	Y*	8,000-20,000	12	2¼	¼,⅜,½	S	S	K	6 11/16	2⅝	EG, HI	CG,GB, RG,VA	11¼	11⅛	SW	387	270
Freud	FT2000	P	2⅝	N	22,000	15	3¼	¼,½	S	S	A	6 11/16	2½	—	EG,TB	12¾	12½	SP	299	190
Hitachi	M12V	P	2 7/16	Y*	8,000-20,000	15	3¼	¼,⅜,½	S	M	A	7	2	EG, SB	CCG, TB,VA	11 13/16	11¾	J	474	290
	TR-8	P	2	N	24,000	6.9	N/A	¼	R	M	A	5⅝	1 5/16	EG, SB	CCG,TB	9	6½	J	232	120
Jepson	7412	P	2½	N	23,000	14.1	3	½	R	M	K	6 5/16	2¾	—	EG,HI,TB	11 5/16	13	T	330	—
Makita	3620	P	1⅜	N	24,000	7.8	1¼	¼	TR	M	K	5⅝	2¾	—	CCG,EG, HI	8 5/16	5¾	J	182	105
	3601B	R	—	N	23,000	8.5	1⅜	¼,½	TR	—	D	6¼	1½	—	CCG,EG, HI	7½	7¾	J	242	—
	3612	P	2½	N	23,000	14	3	¼,½	T	M	A	6¼	2¾	—	CCG,EG, HI	11 5/16	12½	J	376	200
Metabo	RT508	P	1¾	N	27,000	5	¾	¼	S	T	K	5⅞	1 13/16	EG	FS	11¾	7¾	WG	250	—
Milwaukee	5660	R	—	N	24,500	10	1½	¼,⅜,½	S	—	A	6	1¼	—	EG,VA	8	8½	US	299	180
Porter-Cable	100	S	—	N	22,000	6.5	⅞	¼	T	—	K	5½	1 3/16	—	EG,EJ, GB	7	6¾	US	165	95
	690	S	—	N	23,000	10	1½	¼,⅜,½	T	—	K or D	5¾	1 3/16	—	EG,EJ, GB	8	8	US	225	130
	693	P	2½	N	23,000	10	1½	¼,⅜,½	T	S	K	5¾	1 3/16	—	EG,EJ, GB	10½	11½	US	280	180
Ryobi	R-150K	P	2	N	24,000	6.5	1	¼	R	M	K	5¾	2	CC, EG	GB	9	6¼	J	206	100
	R-230	R	—	N	24,000	9.5	1½	¼,⅜,½	S	—	K	6⅛	1½	EG	GB	10½	12	J	257	185
	RE-600	P	2½	Y	10,000-22,000	15	3	¼,⅜,½	T	M	A	6½	1 5/16	EG	GB	12¼	13½	J	398	200
Sears	27501	R	—	Y	11,000-25,000	7.5	1½	¼	TR	—	A	6	1½	HI	LG,P, RG,TB	9¼	8¾	US	—	130
	1743	R	—	N	25,000	8	1½	—	TR	—	A	6	1½	HI, VA	LG,P, RG,TB	10½	9¾	US	—	65
Skil	1835	P	2	N	25,000	9	1¾	¼	R	S	A	6	2¾	CC	EG,GB, LG	9¼	7	US	111	80

N/A Not available.
* Fixed-speed version also available.
** Optional plunge base available with 2½" maximum plunge depth.
1. (P) Plunge; (R) Ring; (RP) Rack and Pinion; (S) Spiral.
2. (R) Rocker; (S) Slide; (T) Toggle; (TR) Trigger.
3. (M) Manual; (S) Self-locking lever; (T) Twist Knob.
4. (A) Arm; (D) D-handle; (K) Knob.
5. (CC) Carrying case; (CCG) Curve-cutting guide; (CG) Circle guide; (EG) Edge guide; (EJ) Edge-joining system; (GB) Guide bushings; (FS) Flex shaft; (HI) Hole insert; (LG) Letter guide; (MC) Metric collets; (P) Pantograph; (RG) Right-angle guide; (VA) Vacuum attachment.
6. (J) Japan; (SP) Spain; (SW) Switzerland; (T) Taiwan; (US) United States; (WG) West Germany.
7. Selling price based on advertised prices at time of article's writing.

toggle switches more convenient than trigger switches.

• **Accessories:** Manufacturers make more accessories for routers than any other portable power tool, increasing the usefulness of this versatile tool even more. For a comparison of the manufacturers' offerings, check the chart on page 69. Note that only a handful of the routers come with edge guides—one accessory that's a must-have for most woodworkers.

• **Plunge locks:** You can lock a plunge router by one of three means: manually by pushing down on a lever; manually by twisting one of the knob handles; or automatically, by releasing a spring-activated lever (our favorite method). Both of the manual methods have their drawbacks. The levers require a lot of force and can vibrate loose. Likewise, the knobs require force to tighten, and can loosen when you're handling the router.

BUYING GUIDE

• **Plunge router fine height-adjustment crank handles** for Hitachi TR-12 (Order No. CH1), Makita 3612 (No. CH2), Bosch 1611 (No. CH3), and Elu 3338 (No. CH4); $29.95 each from Tools Etc., 1567 S. Harbor Blvd., Fullerton, CA 92632. Postage free with orders over $50. Call 800-327-6250 for orders only.

WE'D LIKE TO TAKE THESE ROUTERS HOME

• **Large plunge routers:** We liked almost everything about the Ryobi RE-600, from its variable speed to its fine height-adjustment knob to its large handles. We would prefer a self-locking plunge lever in place of the manual lever and a little beefier ON/OFF switch. But, for a selling price of about $200, this unit offers a lot of value.

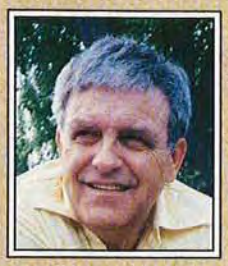
• **Small plunge routers:** Although it's a little pricey at about $235, we like the AEG model OFS 50 for its smooth plunges and cuts, balance, low weight, and quality construction. The Elu 3304 shares these qualities in a ½-pound heavier package, and also has EVS, all for about $180. We name it our second choice only because the knob plunge lock had a tendency to loosen during handling, especially when turning corners on edges.

• **Fixed-base routers:** The Bosch 1604 delivers a lot of power per dollar of cost (1¾ hp, about $120) in a lightweight package. And, its open, spiral-shaped base makes for fast base changes (the 1604 comes with the two-knob base in the foreground, the D-handled model 1606 costs a few dollars more). The Black & Decker 3310 has ¼ less horsepower, but its rack-and-pinion base makes it an ideal candidate for table-mounted and surface routing alike. We also like its all-metal construction. For a few dollars more, B&D offers this router as the Elu model 2721: It's essentially the same machine, but it accepts self-releasing Elu collets.

Written by Bill Krier Technical consultant: Bob Yapp Photographs: Bob Calmer Illustrations: James R. Downing; Kim Downing

BRING ON THE BRACELETS

Direct to You from Saskatoon, Saskatchewan



Ab Odnokon

By now, all of you turners out there probably are aware that we'll go to great lengths to find out-of-the-ordinary projects for you to tackle. Here, we're disclosing the secrets of woodturner Ab Odnoken from the prarie city of Saskatoon. After spending his days as a postal officer, Ab heads to his lathe at night to turn items such as these bracelets for his four daughters and two daughters-in law.

Print this article

Another in a collection of designs from North America's top woodturners

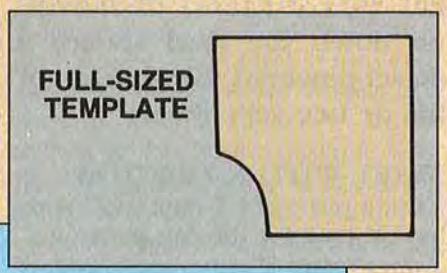
START BY FORMING THE BRACELET BLANK

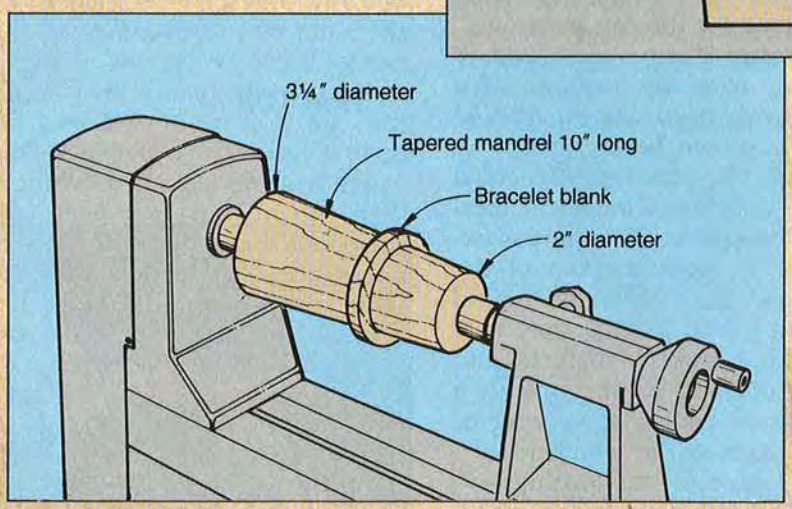
This industrious Canadian turner begins by marking a 3¾"-diameter circle on a piece of ½" scrap stock with a compass. When he runs low on ½" stock, he resaws thicker stock to size on his bandsaw. Then, he mounts a circle cutter to his drill press, centers the pilot bit directly over the compass centerpoint used to mark the circle, and cuts the bracelet's interior. For safety, Ab holds the stock with a handscrew clamp when cutting to prevent it from spinning with the cutter. "I cut the opening to 2¾" in diameter for large wrists, and 2¼" for smaller wrists," Ab notes. Next, I cut the marked circumference of the bracelet blank to shape with a bandsaw, and sand the interior smooth with a drum sander."

TURN THE BRACELET TO SHAPE ON THE MANDREL

After shaping a softwood mandrel between centers (see the drawing *below*), Ab slides the bracelet blank onto the mandrel, and twists the blank clockwise to lock it snugly onto the tapered stock. Then, he uses a ½" gouge to shape the round-over on the narrower end (end nearest the tailstock) of the mandrel. (See the full-sized template *below right* for help.)

Ab then slides the bracelet off the mandrel. He turns it over, slides it back on the mandrel, twists it onto the mandrel to lock it in place, and shapes the other side. Next, he sands the bracelet smooth, removes it from the mandrel, and hand-sands a slight round-over on the interior edges. "To finish the exotic woods such as ebony, cocobolo, and padauk, a good waxing is all that's need," Ab says. "For the softer and domestic woods, I use Minwax tung oil or polyurethane."





Project Design: Ab Odnoken
Photographs: Bob Calmer; Colleen Lawn. Illustrations: Kim Downing; Bill Zaun

OVER-THE-ROAD HEAVY HAULERS

A TRIO OF ADDITIONS TO OUR FAT CAT SERIES

Print this article

If you had fun building the FAT CAT™ bulldozer featured in the December 1987 issue and the lowboy trailer and dump truck shown in the August 1988 issue, you're going to love these toys. They're just right for any child who has ever dreamed of movin' on down the road aboard a diesel-powered 18-wheeler of his or her very own.

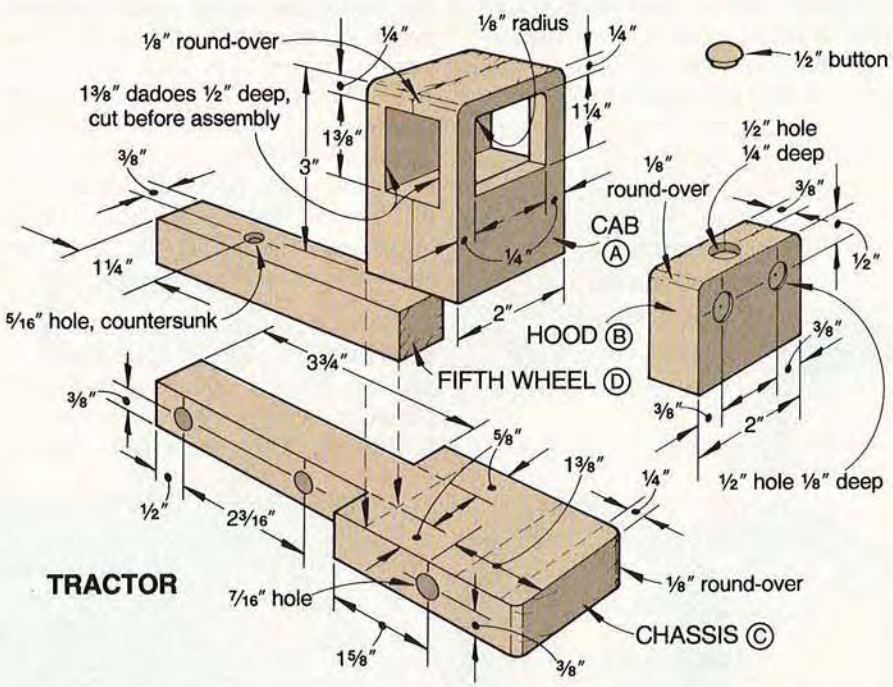
START WITH A TRACTOR

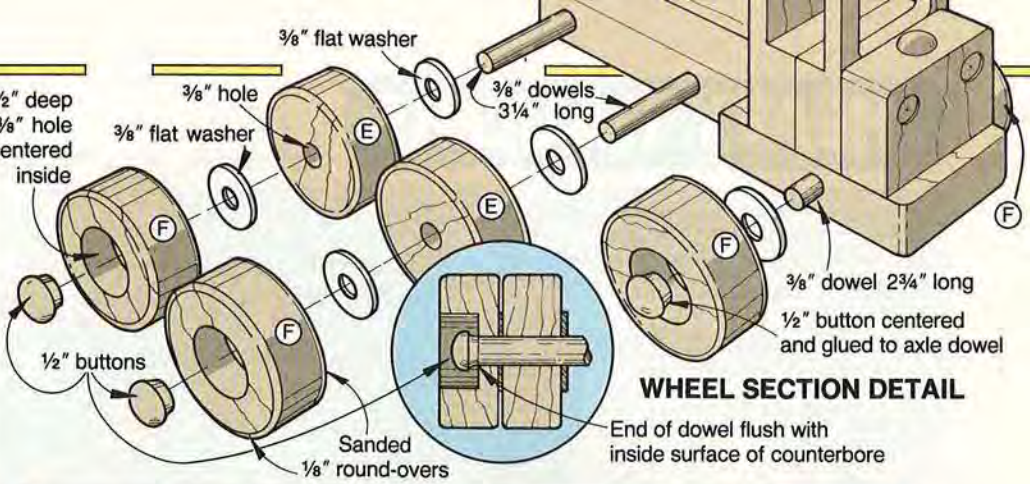
1 Cut a piece of ¾" pine to 2" wide by 12" long for the cab parts (A).

2 Measuring 1" from each end of the pine, mark the location for a 1⅜" dado ½" deep. Cut the marked dadoes as shown *below right.*

3 Crosscut the pine into two equal lengths. Mark the windshield location on one piece. (The pine is extra long, so mark the top of the windshield flush with the top of the dado.) Drill a blade-start hole inside the marked windshield, and cut the opening to shape with a scrollsaw or coping saw. Sand or file the edges of the windshield.

4 Apply glue to the mating surfaces, align the dadoes, and clamp the cab parts (A) together face to





WHEEL SECTION DETAIL

Bill of Materials

Part		Finished Size* T	W	L	Matl.	Qty.
ONE TRACTOR						
A*	cab parts	3/4"	2"	3"	P	2
B	hood	3/4"	2"	1 1/2"	P	1
C	chassis	3/4"	2"	6 3/4"	P	1
D	fifth wheel	3/4"	3/4"	4 1/4"	P	1
E*	inner wheels	3/4"	2" diam.		P	4
F*	outer wheels	3/4"	2" diam.		P	6

*Initially cut parts marked with an * oversized. Then, trim them to finished size listed above according to the how-to instructions.

Material Key: P-pine.

Supplies: 3/8" all-thread rod 5 1/2" long with two 3/8" nuts and seven 3/8" flat washers for sanding the duals, 3/8" flat washers for axle assemblies, 1/2" wood buttons, polyurethane.

Mark the centerpoints, and drill holes 1/2" deep for each outside wheel.

Center the pilot bit over the Forstner-bit depression, and cut the wheels.

face. Later, use a sharp chisel to remove all the excess glue. Trim the top and bottom of the cab lamination to length (3") where dimensioned on the Tractor Drawing at *left*. Sand a 1/8" round-over along the sides of the cab top.

5 Cut the hood (B) to size. Sand a 1/8" round-over on its top corners. Drill two 1/2" holes 1/8" deep for the headlights and a 1/2" hole 1/4" deep centered from side to side for the radiator cap in the hood where dimensioned on the Tractor Drawing.

6 With the bottom and edges of the cab and hood flush, glue and clamp them together. (We placed scrap pieces under the clamp heads to prevent denting the soft pine.)

7 Cut the chassis (C) to shape, and sand a 1/8" round-over along the front corners. Mark the axle-hole centerpoints on one side of the chassis, hold the chassis firmly in a handscrew clamp, and use a drill press to drill the 7/16" axle holes.

8 Cut the fifth wheel (D) to size. Drill a 5/16" hole where shown on the Tractor Drawing.

9 Leaving a 1/4" gap at the front to form the bumper, glue and clamp the fifth wheel on top of the chassis and against the back of the cab. Sand smooth, and glue a 1/2" button into the radiator cap hole.

NOW, FORM THE DUALS

***Note:** You'll need four inside wheels (E) and six outside wheels (F) for each tractor. In addition, you'll need four inside wheels and four outside wheels for each trailer.*

1 To make enough wheels for one tractor, cut a 3/4" piece of pine to 4×33". Use a 3/4×4×27" piece for *each* trailer. Starting 3" from one end, mark centerpoints 3" apart down the center of each board.

2 With a compass, mark a 2"-diameter circle (1" radius) at each marked centerpoint.

3 Chuck a 1" Forstner bit into your drill press. Attach a scrap work surface to your drill-press table. As shown in the photo *above*, center the bit over a marked centerpoint, and bore a 1/2"-deep hole for each outside wheel—6 outside wheels on the tractor and 4 on each trailer. (We used the stop on our drill press to ensure uniform depth.)

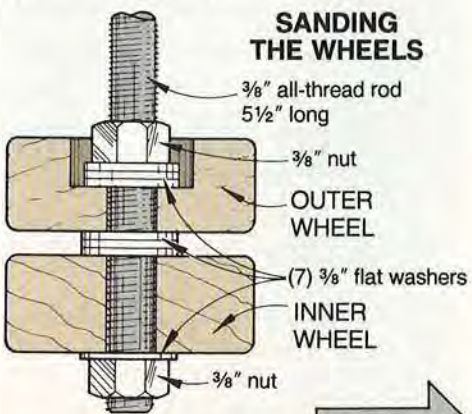
4 Chuck a circle cutter into your drill press. Turn the cutter blade with pointed end on the inside to cut a perfect wheel. Raise the cutter blade 5/8" higher than the bottom of the pilot bit. Center the pilot bit over the centered depression left by the Forstner bit in each 1" hole, and slowly cut the wheels to shape as shown in the photo *above*.

5 Center the circle-cutter pilot bit over the remaining marked centerpoints, and cut the four inside wheels to shape.

6 Remove the circle cutter, and chuck a 3/8" twist drill bit into your drill press. Utilizing a handscrew clamp to secure the wheels, enlarge the 1/4" axle hole in the center of each wheel to 3/8".

7 Cut a piece of 3/8" all-thread rod to 5 1/2" long, and chuck it into your drill press. Attach two wheels at a time to the work arbor where shown in the drawing *below*. With the drill press running at about 750 rpm, hand-sand a slight round-over on each wheel where shown in the drawing. (We found sanding the round-overs safer than trying to rout them on a router table.)

SANDING THE WHEELS



Continued

HEAVY HAULERS

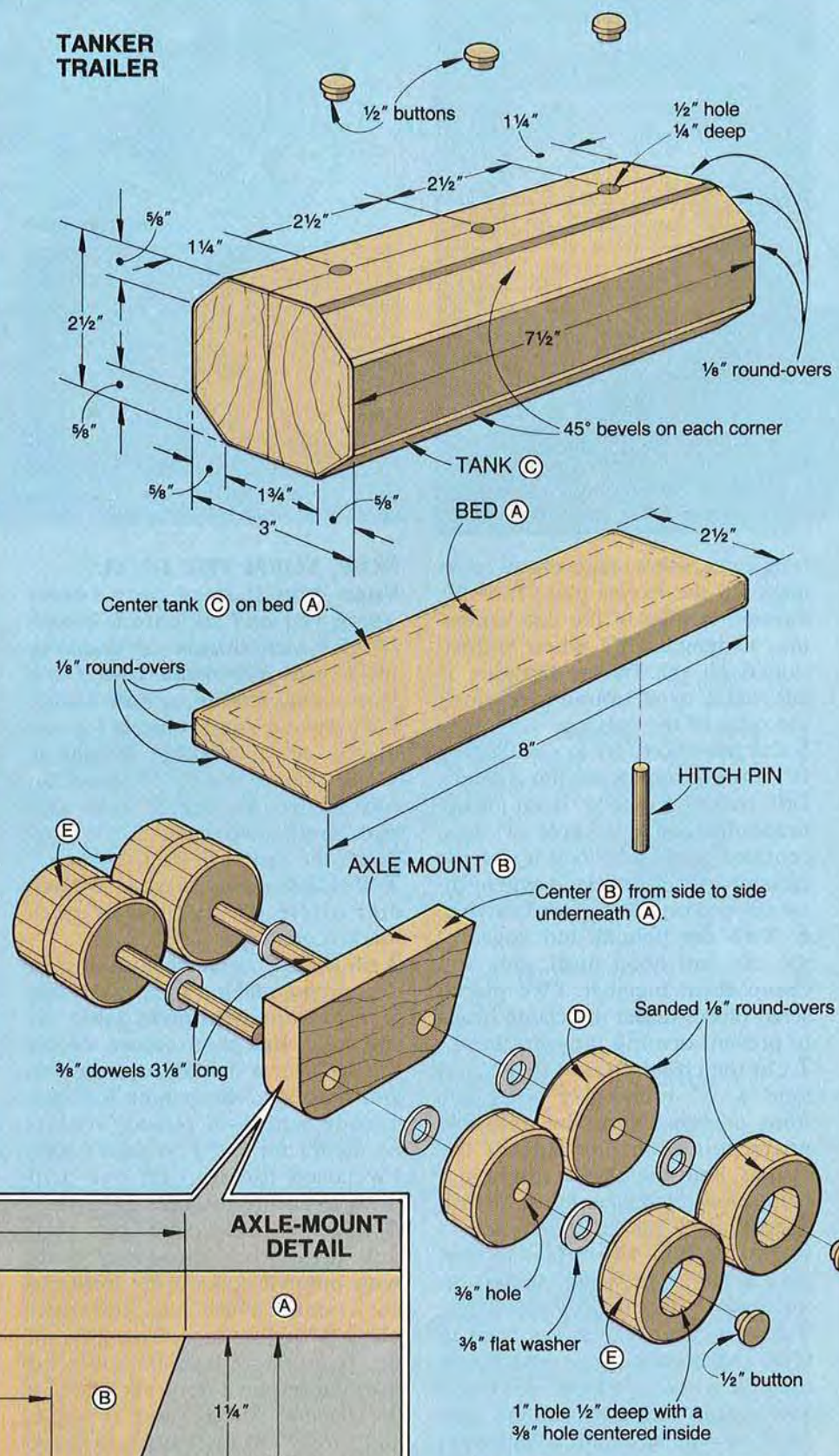
Bill of Materials

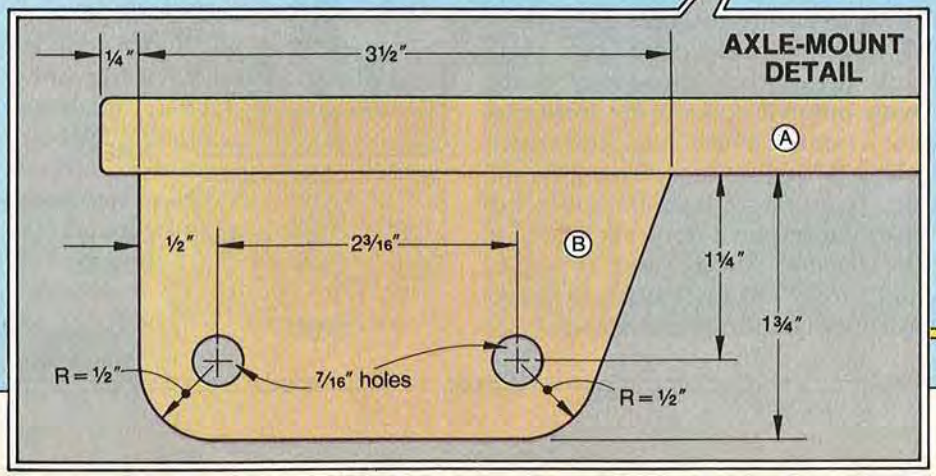
Part		Finished Size* T	W	L	Matl.	Qty.
TANKER TRAILER						
A	bed	½"	2½"	8"	P	1
B	axle mount	¾"	1¾"	3½"	P	1
C*	tank	3"	2½"	7½"	LP	1
D*	inner wheels	¾"	2" diam.		P	4
E*	outer wheels	¾"	2" diam.		P	4
LOG TRAILER						
A	bed	½"	3½"	9"	P	1
B	axle mount	¾"	1¾"	3½"	P	1
C*	inner wheels	¾"	2" diam.		P	4
D*	outer wheels	¾"	2" diam.		P	4
SEMITRAILER						
A	bed and top	½"	2"	8"	P	2
B	axle mount	¾"	1¾"	3½"	P	1
C	front	½"	2"	3"	P	1
D	sides	½"	4"	8"	P	2
E	door	½"	1⅞"	2⅞"	P	1
F*	inner wheels	¾"	2" diam.		P	4
G*	outer wheels	¾"	2" diam.		P	4

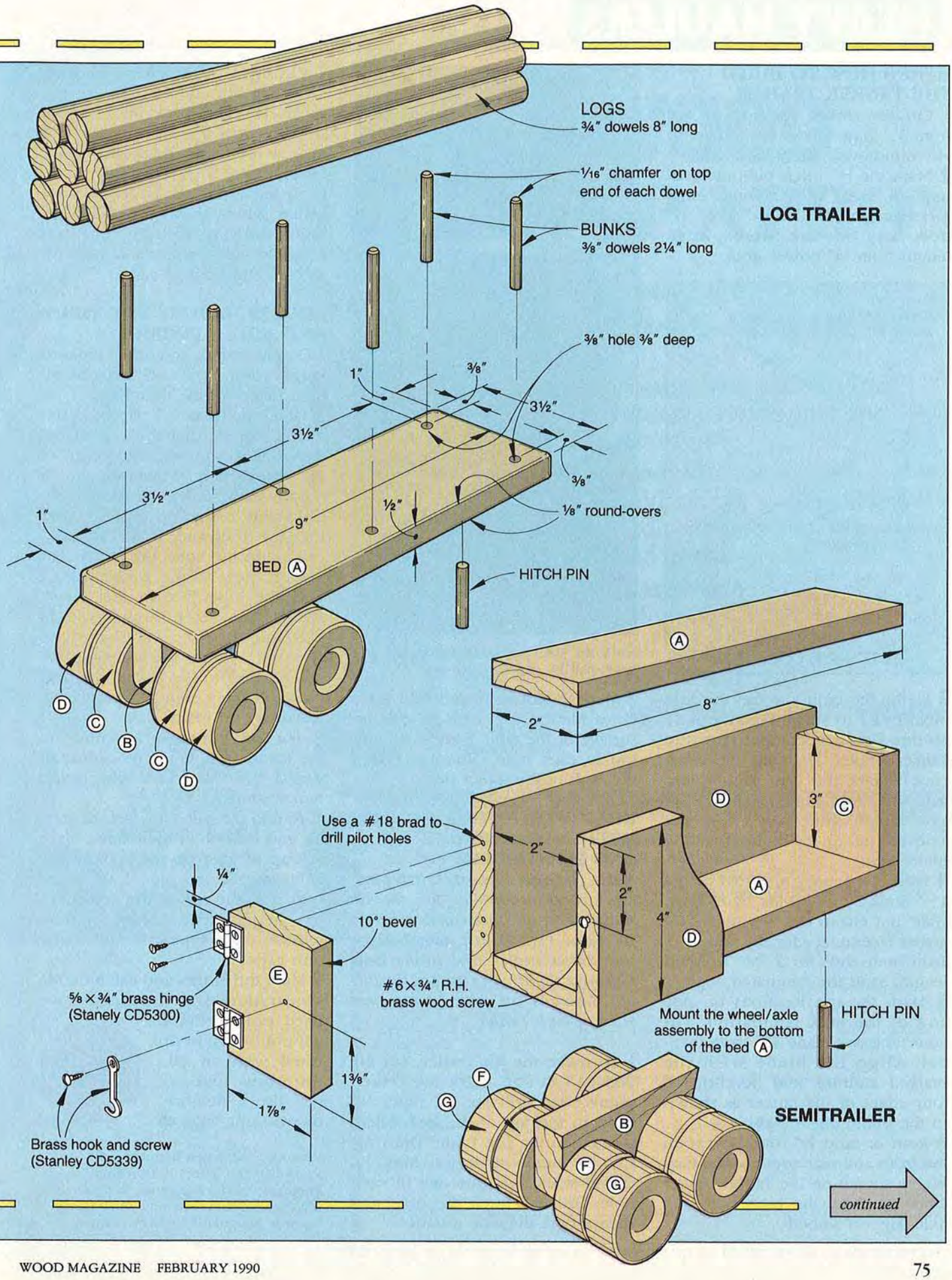
*Initially cut parts marked with an * oversized. Then, trim them to the finished size listed above according to the how-to instructions.

Material Key: P-pine, LP-laminated pine.

Supplies: ⅜" all-thread rod 5½" long with two ⅜" nuts and seven ⅜" flat washers for sanding the duals, ⅜" flat washers for axle assemblies, ¼" dowel stock for hitch pins, ⅜" dowel stock for bunks and axles, ½" wood buttons, one pair of ⅝ × ¾" brass hinges (Stanley #CD5300), brass hook (Stanley #CD5339), #6 × ¾" brass wood screw, ½" birch buttons, polyurethane.



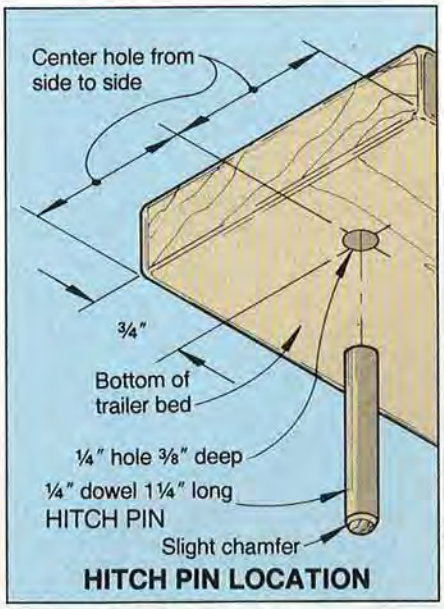



LOGS
¾" dowels 8" long
1/16" chamfer on top end of each dowel
BUNKS
⅜" dowels 2¼" long
LOG TRAILER
⅜" hole ⅜" deep
1"
⅜"
3½"
3½"
3½"
⅜"
1"
9"
½"
⅛" round-overs
BED (A)
HITCH PIN
(D)
(C)
(B)
(C)
(D)
(A)
8"
2"
Use a #18 brad to drill pilot holes
(D)
3"
(C)
2"
2"
4"
(A)
(D)
¼"
10° bevel
(E)
⅝ × ¾" brass hinge (Stanely CD5300)
#6 × ¾" R.H. brass wood screw
Mount the wheel/axle assembly to the bottom of the bed (A)
HITCH PIN
1⅜"
1⅞"
Brass hook and screw (Stanley CD5339)
(F)
(G)
(B)
(F)
(G)
SEMITRAILER
continued

HERE'S HOW TO BUILD THE TANKER TRAILER

1 Cut the tanker bed (A) to size from ½" pine stock. Rout or sand ⅛" round-overs along all edges.

2 Mark the ¼" hitch pin-hole centerpoint, using the drawing *below* for reference. Drill a ¼" hole ⅜" deep and cut the hitch pin to length from ¼" dowel stock.



HITCH PIN LOCATION

3 Scribe the radii and cut the axle mount (B) to shape (see the Axle Mount Detail accompanying the Tanker Trailer Drawing for reference). Mark the centerpoints and drill two 7/16" holes through the axle mount. Glue and clamp the axle mount to the bottom of the trailer bed.

4 From 2×4 stock, cut two pieces 1½" thick by 2½" wide by 8" long. Glue and clamp the two pieces together face to face for the tank (C). Trim both ends for a 7½" finished length. Sand the laminated edges.

5 Mark the cut locations on one end of the tank lamination. Tilt your tablesaw blade 45° from vertical. Align the blade with the marked cutlines, and bevel-rip all four edges of the tanker as shown in the photo *above right.*

6 Rout or sand ⅛" round-overs on the front and rear edges of the tank where shown on the Tanker Trailer Drawing. Sand the tank, bed, and axle support smooth.

Mark the cutlines, align the fence, and bevel-rip the edges of the tank.

7 Mark the location, and drill three holes for the fuel caps in the top surface of the tank. Glue a ½" button in each hole. Glue and clamp the tank to the trailer bed.

ROUND OUT YOUR CONVOY WITH A LOG TRAILER AND SEMITRAILER

Note: *The axle supports, hitch pins, and wheel assemblies for the remaining trailers are constructed in the same way as just described for the tanker trailer. The trailer beds (A) vary slightly in size. See the Bill of Materials on page 73 for part sizes of each trailer.*

1 To make the log trailer, cut the bed (A) to size, mark the centerpoints, and drill six ⅜" holes ⅜" deep in the top of the bed where located on the Log Trailer Drawing. Cut the bunks to length from ⅜" dowel stock and glue one in each hole. Drill the hitch pin hole, and then secure the axle mount.

2 Cut the semitrailer bed and top (A), axle mount (B), front (C), sides (D), and back door (E) to size. To allow the door to open and close without binding, sand a 10° bevel on the latch side of the door. Glue and clamp the trailer parts together where shown on the Semitrailer Drawing. Drill the hitch pin hole and secure the axle mount. Attach the hinges and catch.

FINALLY, MOUNT THE TIRES AND ADD A FINISH

1 Cut the tractor and trailer axles to length from ⅜" dowel stock as dimensioned on the drawings.

2 Glue one outer wheel onto each dowel axle so that the end of the dowel is flush with the inside of the counterbore where shown on the Wheel Section Detail on the top right-hand corner on page 73. After the glue dries, slide a ⅜" flat washer next to the outer tire and an inner tire next to the washer. Don't glue the inner tire to the dowel. Slide the axle through the axle hole, and then add a washer, inner tire, and another washer. Glue the outer wheel to the end of the axle dowel, leaving enough free play so the tires turn easily.

3 For the front-axle assembly on the tractor, follow the procedure in step 2 with two outer wheels and two washers.

4 To add the hub caps, set the tractor and trailers on their sides. Place a drop of glue on the ends of the axle dowels, and glue a ½" wood button to the end of the dowel. After the glue dries, flip over the assemblies and repeat for the other hub caps.

5 Mask the hinges and catch on the semitrailer. Add the finish (we used polyurethane; left unfinished or finished with an oil, pine toys tend to get dirty). Remove the masking tape.

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Project Design: James R. Downing
Photographs: Jim Kascoutas; Bob Calmer
Illustrations: Kim Downing; Mike Henry
Graphic Designer: Perry A. McFarlin

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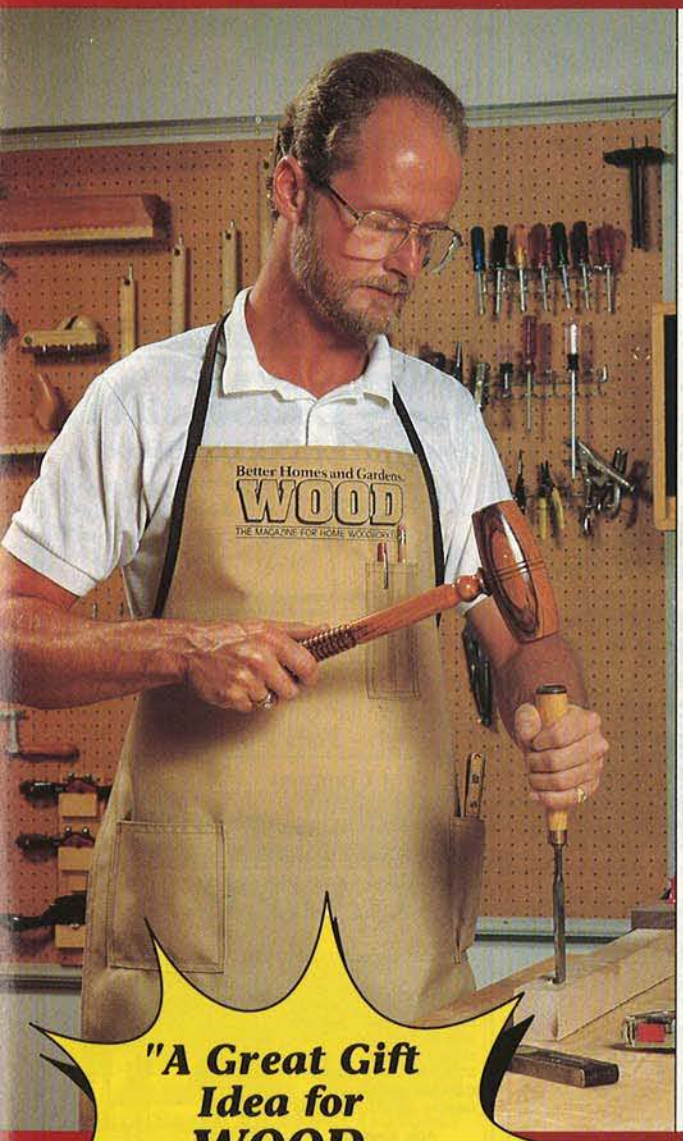

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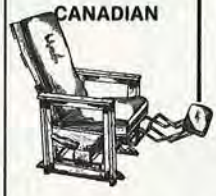

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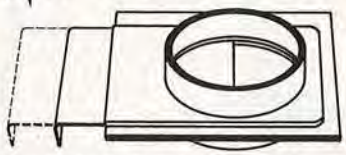

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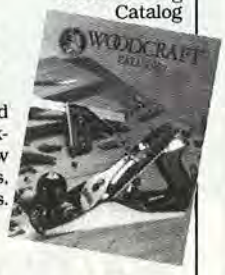

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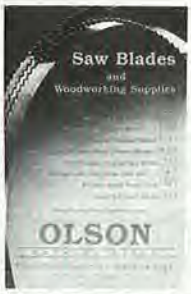

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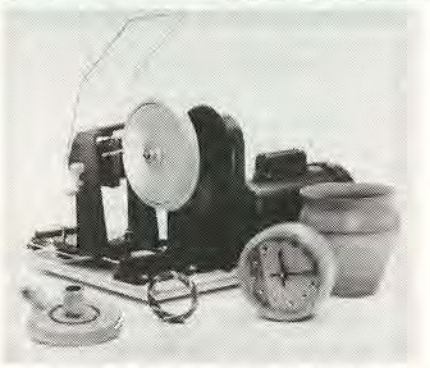

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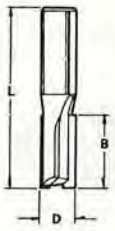

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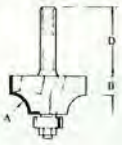

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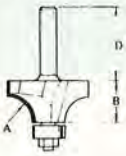

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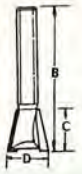

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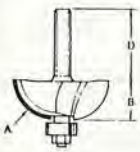

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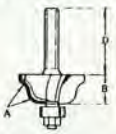

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Continued on page 86

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Continued from page 85

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From Down Under comes this solution for turning green wood. Australians have successfully used their "two-pack polyurethane"—separately packaged cans of hardener and plastic—for more than 20 years. Applied as directed, Arnall Adeze finish effectively seasons green wood, allowing craftsmen to turn stock that might otherwise crack or distort while drying. The product mixes easily in a 1:1 ratio, sets up quickly, and completes its curing job in 24 hours. I finished several bowls and they all turned out beautifully, even though the wood was so wet I could feel the moisture. Adeze also works for many jobs beyond turning, but remember to always use the product in a well-ventilated area—the finish releases a strong odor.

—Tested by Steve Oswalt

Arnall Adeze finish, $37.15 ppd. for ½-liter containers of polyurethane and hardener (about 1 quart mixed) and 1 liter of thinner in three sheens—gloss (cat. no. 50.10), satin (cat. no. 50.20), and mat (cat. no. 50.30)—from Garrett Wade Co., 161 Avenue of the Americas, New York, NY 10013. To place orders, call 800-221-2942.

Continued on page 88

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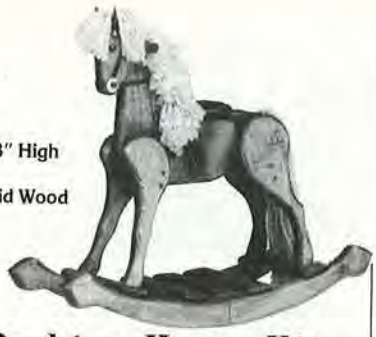

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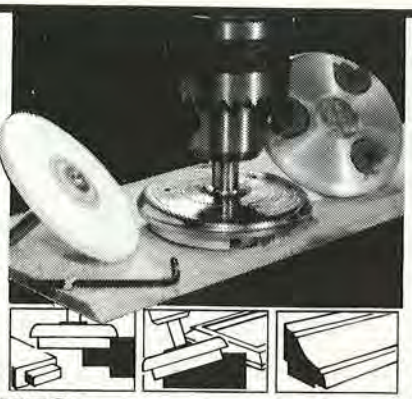

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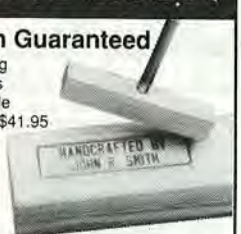

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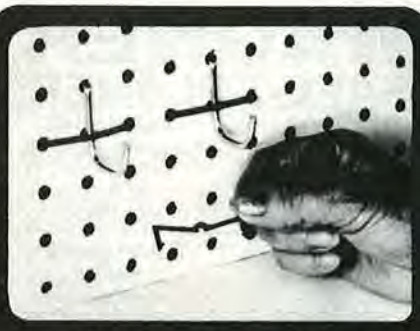

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Continued from page 86

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—Tested by Steve Oswalt

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10. Known for its quality hardwoods, EMPEROR CLOCK COMPANY offers a broad selection of mantel clocks, wall clocks and grandfather clocks, as well as furniture accent pieces, in do-it-yourself kit form or completely assembled and finished. Send $1.00 for color catalog.

11. Full size patterns by THE WINFIELD COLLECTION. Our new catalog is overflowing with hundreds of fun projects . . . door harps, whirligigs, folk art Santas and shelf sitters, country shelves and shadowboxes, miniatures, games, toys, animal and Christmas yard decorations and much more. Satisfaction guaranteed. Catalog $2.00

12. Tools on Sale, A Division of Seven Corners Ace Hardware, has wide variety of tools for the professional or do-it-yourselfer. Catalog, perfect for anyone using hand or power tools, is packed with most respected names in the industry: Makita, Milwaukee, Skil, B & D, Ryobi, Delta, Bosch & many more. We are noted for fast, friendly service. Free catalog. TOOLS ON SALE.

13. 48-page catalog is filled with tools and supplies for decoy and wood carvers and wood turners including precision grinding tools, sharpening stones, Foredom tools, Fire Brush burners, pneumatic sanders, glass eyes, pewter feet and patterns. P.C. ENGLISH, INC. Catalog $1.00.

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16. Ripstrate Saves Fingers – for table saw and radial arm saw users. Brochure describes the Ripstrate and shows how it gives straighter cuts, speeds, the work, prevents kickbacks, and keeps hands away from the blade. FISHER HILL PRODUCTS. 25¢.

17. Finally a sliding table that does not take up a lot of space. And it works! Cast iron table with 52" cutting capacity and adjustable rail system. Attaches to almost any saw and shaper. This and more. Send for free information. LAGUNA TOOLS.

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22. WOOD Magazine's five-year **Cumulative Index** helps you find articles fast in issues 1 through 30. Complete general index plus mini indexes for projects, carving, turning, tools, wood, finishing and refinishing. Bonus three-page reference guide features 29 wood species. Also includes information about article reprints. $4.95.

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26. Executive wood toys! If you want more in the line of wood toys, let Toys and Joys offer you a line of detailed patterns for classic cars, trucks, trains, etc. We also carry a complete line of wood toy parts. Ask about our deluxe spoke wheels. TOYS AND JOYS catalog $1.00.

27. One-page brochure from NOVA TOOL COMPANY describes branding irons that enable you to put your name on your woodwork quickly and easily. Made especially for branding wood, they are available with 1, 2 or e lines of copy or with your logo. $1.00.

28. "Innovation" sets Leichtung-Workshops apart from the rest! You'll find tools and accessories for the serious woodworker and do-it-yourselfer, many our exclusive designs! 400+ items in our free 78-page color catalog! LEICHTUNG-WORKSHOPS.

29. Klean-Strip's Free Guide to Paint & Varnish Removal. This Free 20-page booklet offers professional tips for removing paint and varnish from wood. The booklet includes detailed instructions and color photographs to help you achieve outstanding results. KLEAN-STRIP.

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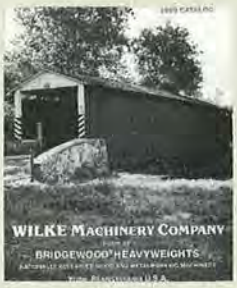

33. WILKE MACHINERY COMPANY offers new 52-page color catalog complete with photos and specifications of the entire line of BRIDGEWOOD brand woodworking machinery. Bridgewood offers machinery for the serious home woodworker as well as the professional and industrial shops. $1.00.

34. 212-page GARRETT WADE catalog with over 2500 selections of the finest tools and finishes. Also valuable reference material on care and use of tools. This premium group of products includes hand tools, books, finishes, stones, benches and turning tools. Power tools and accessories featuring INCA woodworking machinery. $4.00.

35. Econ-Abrasives is proud to introduce our new line of BOSCH carbide tipped router bits. As with our famous sandpapers, our industrial router bits will cut thru the competition and impress you both in quality and price. ECON-ABRASIVES – Every bit worth asking for! Free information.

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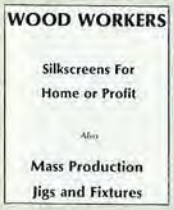

37. Turn a $.30 piece of wood into a $10.00 plaque with 3 silkscreens. It only takes a few minutes to make the jig (from scrap plywood) & learn how to screen. Inexpensive & easy to use. Slant-top breadboxes & wall clocks, grist mills & blacksmith shops are only a few samples of our products and screens. Jig plans for mass production also available. Send for whole story. Free. JENNINGS PRODUCTS.

38. Anytime, anywhere, anywood with the WILLIAMS & HUSSEY moulder-planer. Picture frames, Crown Moldings, Raised Panels, Curved Panels, Curved Moldings, and more. Easy two-minute cutter change-over makes it easy to plane hard woods and cut mouldings. Five Year Warranty and Free 30-day Trial. Catalog $1.00.

39. WARREN TOOL COMPANY'S Woodcarver's Catalog features the finest quality whittling and carving hand and power tools, books, sharpening stones, wood & supplies. Remember our motto, "Warren Tools give you the edge." We sell only the finest professional tools. Catalog $1.00.

40. MAKITA U.S.A., INC. – Makita offers a 128-page pocket catalog of its professional line of power tools with special emphasis on the entire cordless line. Free catalog provides complete information along with available accessories and practical applications.

41. 102 Birdhouses, Feeders You Can Make! Complete illustrated plans for building charming birdhouses & feeders. Now it's easy to make shelters, apartments, covered wagons, bungalows, nesting boxes, wind vane feeders, wood bird bath with fountain, swivel top cafe, even castles & mansions . . . Designed to attract your choice of 26 species such as Bluebirds, Song Sparrows, Wood Duck, House Finches, Purple Martins, etc. Complete plans with tips on materials, painting, finishing, drainage, ventilation. ATH INC. Only $10.95.

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56. Penn State's new brochure features lower pricing on their expanded line of woodworking equipment. Scroll Saws, Planers, Dust Collectors, Wood Lathes, and several new items are described. Valuable discount coupons are included. Free brochure. PENN STATE INDUSTRIES.

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67. Martin's 1833 Shop & Woodworkers Dream Catalog is packed with strings, accessories, Martin memorabilia, books, exotic woods, guitar parts and instrument kits for mail order. The MARTIN GUITAR COMPANY. Cost – $2.00.

68. Scroll saws, Accessories, Patterns, Books. A complete brochure on al kinds of scroll saw accessories. Featuring Excalibur scroll saws and lettering layout guides from Seyco, "the Scroll Saw Specialists." Free pamphlet "Selecting your Scroll Saw" included. Brochure $1.00. SEYCO SALES CO.

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72. HORTON BRASSES' catalog shows over 500 items of authentic reproduction hardware from the 1700s and on into this century. These are superior reproductions of Chippendale, Hepplewhite, Queen Anne, Sheraton, Victorian and early 1900s brass furniture hardware. Catalog $3.00.

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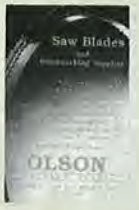

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Statement of Ownership, Management and Circulation (Required by 39 U.S.C. 3685) 1A. Title of Publication: Better Homes and Gardens Wood. 1B. Publication No. 724890. 2. Date of Filing: September 26, 1989. 3. Frequency of Issue: Bimonthly. 3A. No. of Issues Published Annually: 6. 3B. Annual Subscription Price: $18.00. 4. Complete Mailing Address of Known Office of Publication: 1716 Locust Street, Des Moines, Polk County, IA 50336. 5. Complete Mailing Address of the Headquarters of General Business Offices of the Publisher: 1716 Locust Street, Des Moines, IA 50336. 6. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor: Publisher: William Reed, 750 Third Avenue, New York, NY 10017; 1716 Locust Street, Des Moines, IA 50336; Editor: Larry Clayton, 1912 Grand Avenue, Des Moines, IA 50312; Managing Editor: Carl Voss, 1912 Grand Avenue, Des Moines, IA 50312. 7. Owner: Meredith Corporation, 1716 Locust Street, Des Moines, IA 50336. 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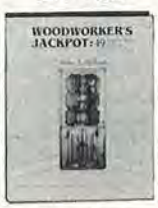

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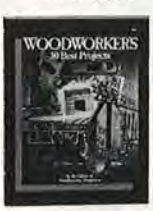

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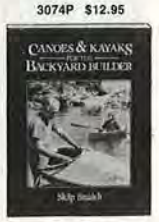

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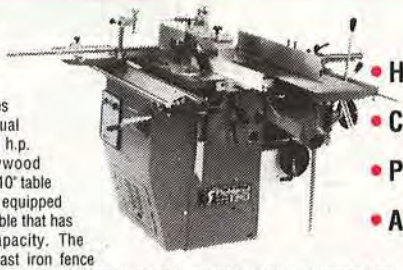

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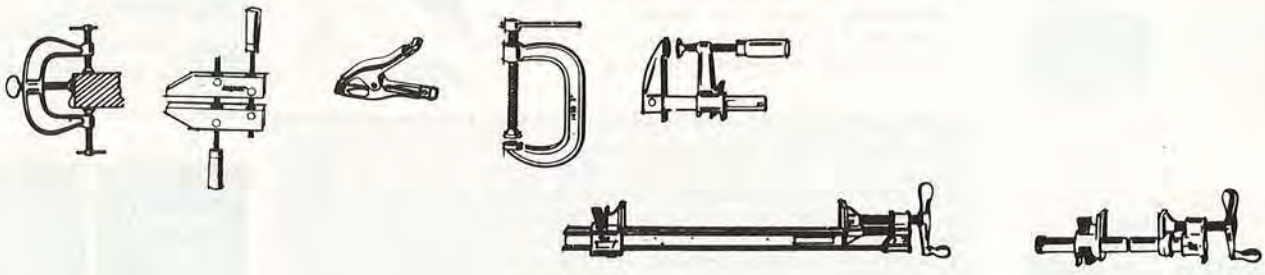

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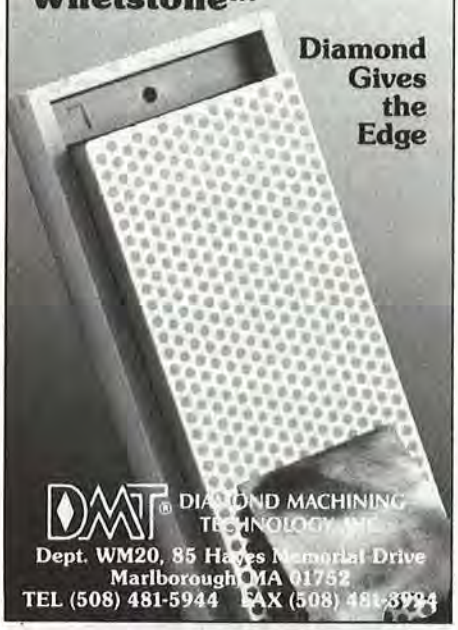
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41.	77.	100.	878.	1250.	1365.	
42.	78.	142.	955.	1251.	1930.	
44.	84.	565.	1205.	1293.	1931.	
57.	85.	615.	1245.	1315.	2115.	
76.	99.	860.	1249.	1350.	2335.	

PRICED LITERATURE

Numbers below refer to items on which there is a charge.
Please include proper remittance.

3.... $1.00	265.... $1.00	390.... $1.00	563.... $2.00	965.... $1.00	1320.... $3.00	1650.... $1.00
4.... $1.00	310.... $2.00	401.... $1.00	578.... $2.00	975.... $2.00	1321.... $1.00	1661.... $2.00
47.... $1.00	315.... $1.00	454.. $10.45	592.... $1.00	1005.... $1.00	1360.... $1.00	2077.... $1.00
87.... $1.00	328.... $2.00	475.... $1.00	640.... $6.00	1030.... $1.00	1372.... $1.00	2078.... $2.00
89.... $1.00	332.... $1.00	480.... $1.00	645.. $10.00	1050.... $2.00	1401..... 50¢	2092.... $3.00
93.... $1.00	335.... $3.00	496.... $1.00	820.... $1.00	1080.... $1.00	1405..... 75¢	2185.... $1.00
94.... $1.00	340.... $1.00	510.... $1.00	850.... $1.00	1140.... $2.00	1430.... $3.00	2190.... $2.00
112.... $2.00	345.... $3.00	520.... $1.00	855.... $4.00	1235..... 25¢	1450.... $1.00	
160.... $1.00	370.... $1.00	545..... 50¢	900.... $4.00	1267..... 50¢	1480.... $1.00	
190.... $1.50	375.... $1.50	558.... $1.00	920.... $1.00	1307.... $1.00	1490.... $1.00	

Name (please print) _____

Address _____

City _____

State _____ Zip Code _____

I AM ENCLOSING:

$_____ for priced items

$ 2.00 for handling

$_____ total remittance

ORDER TOLL FREE 1-800-328-0457 – MAIL ORDER HOURS 7:00-5:30 C.S.T. MONDAY-FRIDAY

DELTA BENCH TOP TOOLS

Model		List	Sale
23-700	Wet/dry grinder	201	159
23-680	6" bench grinder ¼ H.P.	81	66
23-880	8" bench grinder ½ H.P.	136	105
23-980	10" bench grinder 1 H.P.	245	235
11-950	8" drill press	164	135
14-040	14" drill press	313	309
40-150	15" hobby scroll saw	178	139
28-150	10" hobby band saw	189	144
31-050	1" belt sander 2.0 amp.	93	75
31-460	4" belt/6" disc sander	178	139
31-340	"NEW" 1" belt/8" disc sander	226	169

DELTA STATIONARY

34-761	10" unisaw 1½ H.P.	1715	1339
34-740	Super 10" motorized table saw	590	439
34-429	10" tilting arbor bench saw 1½ H.P	1479	1049
33-990	10" radial arm saw	727	565
11-072	32" radial drill press	487	399
37-280	6" motorized jointer	440	369
50-179	¾ H.P. 2 stage dust collector	435	339
50-180	1 H.P. dust collector	535	425
50-181	2 H.P. dust collector	760	619
37-154	Deluxe DJ-15 6" jointer w/¾ H.P. motor	1288	999
33-150	8¼" saw buck	770	499
33-050	"NEW" 8¼" Sawbuck	742	559
34-330	"NEW" 8¼" Table Saw 13A	321	245
34-570	10" motorized table saw	437	369
34-985	¼ H.P. stock feeder	698	489
32-100	"NEW" stationary plate jointer	645	445
36-040	"NEW" 8¼ compound miter saw	216	169

MILWAUKEE TOOLS

0395-1	9.6V cdlss. drill w/case	264	159
0219-1	9.6V cdlss. drill w/case	277	165
0385-1	7.2V cdlss. drill w/case	174	115
0224-1	⅜" drill 4.5A magnum	189	112
0234-1	½" drill 4.5A mag 0-850 rpm	199	115
0244-1	½" drill 4.5A mag 0-600 rpm	199	115
0222-1	⅜" drill 3.5A 0-1000 rpm	174	105
0228-1	⅜" drill 3.5A 0-1000 rpm	164	98
0375-1	⅜" close quarter drill	208	129
0379-1	½" close quarter drill	243	145
6539-1	Cordless screwdriver 190 rpm	113	69
6540-1	Cdlss. screwdriver w/bits & cse	154	99
6546-1	Cdlss. screwdriver 200 & 400 rpm	120	75
3102-1	Plmbrs rt angle drill kit	330	169
3002-1	Electricians rt angle drill	320	185
5399	½" D-hdle ham drill kit	304	185
1576-1	H.D. Hole Hawg w/cs	415	229
6511	2 sp SawZall w/cs	214	125
6405	8¼" circle saw	219	129
6750-1	Drywall gun 0-4000 4.5A	154	95
6507	TSC SawZall w/case	229	129
6170	14" chop saw	430	249
6012	Orbital sander 3⅝"x7⅜"	189	109
6014	Orbital sander 4½"x9⅛"	199	115
6305	6¼" cordless circle saw	299	175
6753-1	Drywall gun 0-4000 3.5A	134	83
6977	Var. temp heat gun	114	75
5397-1	⅜" v. spd. hammer drill kit	232	145
5371-1	½" v. spd. hammer drill kit	318	179
3107-1	½" v. spd. rt angle drill kit	340	195
6754-1	Drywall gun 0-4000 4.5A	179	119
6747-1	Drywall driver-0-2500	154	95
0230-1	⅜" drill 0-1700 rpm	179	105
3300-1	½" v. spd. magnum rt angle kit	299	179
5660	Router 1½ H.P.—10 amp	299	189
5680	Router 2 H.P.—12 amp	350	225
5455	⅞" polisher 1750 rpm	209	125
6215	16" chain saw	280	179
8975	Heat gun	89	59
6365	7¼" circular saw	195	114
6366	7¼" circ saw w/fence & bld	204	119
6368	7¼" circ saw w/fence, bld & cse	233	135
0216-1	2 spd cordless drill Hi-torque	222	129
0235-1	½" drill keyless chuck mag	209	119
6016	¼ sheet pad sander	79	52
6145	4½" grinder 10,000 rpm	154	95
6142	6145 w/case & accessories	192	119
0239-1	½" drill keyless chuck	199	114
6749-1	Drywall gun 0-2500 4.5A	189	125
6377	7¼" worm drive saw	295	165

FREUD SAW BLADES

⅝" Bore—Industrial Grade
CARBIDE TIPPED SAW BLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen. Purp. ATB	10"	40	58	39
LU81M010	Gen. Purp. TiCh	10"	40	65	43
LU82M010	Cut-off	10"	60	77	45
LU84M011	Combination	10"	50	65	42
LU85M010	Super Cut-off	10"	80	96	57
LM72M010	Ripping	10"	24	57	38
LU73M010	Cut off	10"	60	70	44
LU87M010	Thin kerf	10"	24	60	39
LU88M010	Thin kerf	10"	60	74	44
LU98M010	Ultimate	10"	80	107	79
LU89M010	Non-ferrous metal	10"	72	87	65
PS203	Gen'l Purp.	7¼"	24	25	19
PS303	Plywood	7¼"	40	36	25
DS306	6" Dado - Carbide			184	105
DS308	8" Dado - Carbide			196	115
F8	1⅛"x⅝" Biscuits 1000-Qty			32	27
F10	2⅛"x⅝" Biscuits 1000-Qty			32	27
F20	2⅝"x1" Biscuits 1000-Qty			34	29
FA	Assorts Biscuits 1000-Qty			34	29
WC104	4 pce. chisel set w/cse ¼"-1"			54	39
WC106	6 pce. chisel set w/cse ¼"-1"			73	52
WC110	10 pce. chisel set w/cse ¼"-1½"			113	79
FB100	16 pce forstner bit set ¼"-2⅛"			284	155
94-100	5 pce router bit door system			288	155
JS100	Biscuit Jointer w/case			300	159
CE82	Planer w/cse, carb blds & guide			219	129
FT2000	3¼ H.P. plunge router			299	185

MAKITA CORDLESS

Model		List	Sale
6070DW	⅜" var. spd. rev. drill, 7.2v	123	75
6071DWK	⅜" var. spd. rev. drill w/removable batt, 7.2v	190	109
5090DW	3⅜" saw kit, 9.6v	243	135
5600DW	6¼" circular saw, 10.8v	317	179
6010DWK	⅜" cordless drill kit, 7.2v	155	95
6010SDW	⅜" cordless drill, 7.2v	103	65
DA3000DW	⅜" angle drill, 7.2v	238	135
8400DW	Hammer drill kit, 9.6v	258	149
4390DW	9.6 volt cdls. recip saw kit	218	124
4300DW	Jig saw kit comp., 9.6v	220	125
6010DL	⅜" drill w/flashlight, 7.2v	198	115
6710DW	Cordless screwdvr kit, 7.2v	186	105
6012HDW	2 spd. driver drill w/clutch & case, 9.6v	224	115
6092DW	V/spd. drill, kit complete	237	120
6093DW	V/spd. drill w/clutch—complete	248	125
6891DW	Drywall gun 0-1400, 9.6v	225	119
632007-4	9.6 volt battery	49	30
632002-4	7.2 volt battery	42	28
5007NBA	7¼" saw w/elec. brake	228	124
5008NBA	8¼" saw w/elec. brake	276	155
9045B	¼ sheet pad sander	80	49
9900B	3"x21" belt sander w/bag	254	145
9924DB	3"x24" belt sander w/bag	268	149
9045B	½ sheet finish sander	215	125
9045N	½ sht fin. sand. w/bag	219	129
4200N	4½" circ. saw 7.5 amp	213	119
5201NA	10¼" circ. saw 12 amp	560	295
4301BV	Orb. v/sp jig saw 3.5 amp	274	149
JR3000WL	2 sp recip saw w/case	220	122
JR3000V	Vs. recip saw w/case	224	124
LS1020	New 10" miter saw	440	239
9820-2	Blade sharpener	354	199
410	Dust collection unit	480	269
3705	Offset trimmer	255	145
1900BW	3¼" planer w/case	198	114
1100	3¼" planer w/case	381	209
9207SPC	7" sander-polisher	262	149
3601B	1¾ H.P. router	242	139
3700B	½ H.P. trimmer	180	109
9501BZ	4" grinder, 3.5 amp	137	69
B04530	6" sound sander	95	59
B04550	¼ " sheet pad sander w/bag	85	55
DA3000R	⅜" angle drill	256	145
DP4700	½" v/sp w/rev. 4.8 amp	198	119
HP2010N	¾" v/sp hammer drill w/case	285	165
2708W	8¼" table saw	474	265
2711	10" table saw w/brake	800	479
GV5000	Disc sander 5"	109	69
6800DB	2500 rpm 3.5 amp, drywall	140	89
6800DBV	0-2500 rpm 3.5 amp, drywall	154	95
6801DB	4000 rpm 3.5 amp, drywall	149	89
6801DBV	0-4000 rpm 3.5 amp, drywall	154	95
2030N	12" planer/jointer	2970	1825
2040	15½" planer	2470	1525
1805B	6¼" planer kit w/case	546	359
JV1600	var. speed jig saw	220	129
JV2000	var. speed orb. jig saw	242	135
5005BA	5½" circular saw	211	119
9503BH	4½" sander-grinder	153	89
6404	⅜" drill 0-2100 rpm, 2 amp	102	65
6510LVR	⅜" drill rev. 0-1050 rpm	137	79
6013BR	½" drill rev. 6 amp	240	135
5402A	16" circular saw - 12 amp	605	328
3612BR	3 H.P. plunge router	376	189
9401	4"x24" belt sander w/bag	302	165
3620	1¼ H.P. plunge router w/case	182	105
4302C	V/spd. orb. jig saw	287	155
5077B	7¼" Hypoid saw	248	138
LS1440	14" Miter saw	624	425
2414	14" cut-off saw AC/DC	350	205
5007NB	7¼" circ saw 13 amp	209	119
3612B	3 HP plunge router sq/b	376	195

SKIL SIZZLERS

Model		List	Sale
5510	(551) 5½" circ saw	112	95
5625	(552) 6½" circ saw	175	124
5656	(553) 7¼" circ saw	132	119
5665	(554) 8¼" circ saw	204	145
5750	(807) 7¼" circ - drop foot	198	142
5765	(808) 8¼" circ - drop foot	216	149
5790	(810) 10¼" circ - drop foot	400	269
5825	(367) 6½" worm saw	229	148
5865	(825) 8¼" worm saw	250	164
4580	Vari - orbit jig saw w/case	144	105
3810	10" Miter saw	263	219
595	3"x21" sander w/bag 5.5A	197	125
7575	¼" palm sander	52	49
7313	3x18 belt sander 4.5A	72	65
77	7¼" worm drive saw	230	139
5350	2½ HP circ. saw	80.99	74
5250	2¼ HP circ. saw	58.99	54

XTRA SPECIAL BY SKIL

2735-04	12v V.Spd. Cordless Drill comp. w/case & 2 Batt	210	135

LEIGH DOVETAIL JIGS

D1258-12—List 314.00—Sale 265.00
D1258-24—List 375.00—Sale 305.00
LEIGH INSTRUCTIONAL VIDEO—SALE 29.00!!

HITACHI TOOLS

Model		List	Sale
TR6	Trimmer	177	95
TR8	Plunge router, 1½ H.P.	219	119
TR12	Plunge router, 3 H.P.	354	169
C10FA	10" dlxe miter saw	490	275
C8FB	8½" slide compound saw	859	479
FREUD	LU91M008 - 8½" c/bld 48 tooth	58	45
C15FB	15" miter saw	745	399
FREUD	LU85M015 - 15" c/bld 108 tooth	181	115

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DELTA TOOLS

34-444 Table Saw Complete w/1½ H.P. motor & stand 619.00

34-445—34-444 Table Saw complete w/30" Unifence 779.00

22-561 "NEW" 13" Planer includes 2 H.P. motor 1095.00

28-283F 14" Band Saw w/enclosed stand & ¾ H.P. motor 685.00

70-200 NEW 20" Drill Press 719.00

17-900 16½" Floor Drill Press 379.00

40-601 18" Scroll Saw w/stand and blades 689.00

DELTA
#34-080
10" MITER BOX
XTRA SPECIAL
209.00
List 289.00

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AMERICA'S LOWEST PRICED TOOLS
FREE FREIGHT TO THE
48 CONTINENTAL STATES ON EVERY ITEM.
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

PIRANHA By Black & Decker

CARBIDE TOOTH SAW BLADE

Model#	Diameter	#Teeth	List	Sale
73-716	6-1/2	18	13.10	7.10
73-756	6-1/2	36	28.96	16.30
73-717	7-1/4	18	13.14	7.10
73-737	7-1/4	24	16.36	9.00
73-757	7-1/4	40	29.72	16.35
73-758	8	40	42.04	24.15
73-759	8-1/4	40	42.86	24.60
73-719	8-1/4	22	18.96	10.60
73-739	9	30	31.48	16.25
73-769	9	60	66.58	35.90
73-715	5-1/2	16	13.00	7.30
73-704	7-1/4	18	19.50	12.49

THE SPECIAL BLACK AND DECKER PIRANHA BLADE PRICES ARE BACK!!!

Model#	Diameter	#Teeth	List	Sale
73-740	10	32	33.20	15.95
73-770	10	60	61.46	29.95
73-711	10	50	65.08	29.95

JORGENSEN STEEL I-BAR CLAMPS

Model	Size	List	Sale
7224	24"	25.82	16.50
7236	36"	27.71	17.50
7248	48"	30.44	18.50
7260	60"	33.90	21.99

ADJUSTABLE HANDSCREWS BY JORGENSEN

Item No.	Jaw Length	Open Cap	List	Sale	Box of 6
#3/0	6"	3"	14.83	8.50	47.60
#2/0	7"	3½"	15.94	9.50	51.00
#0	8"	4½"	17.74	10.25	58.40
#1	10"	6"	20.29	12.39	68.10
#2	12"	8½"	23.29	14.25	78.00
#3	14"	10"	28.53	18.30	101.75
#4	16"	12"	38.38	23.75	139.95

STYLE 37 2½" Throat ¼"x¾" JORGENSEN

Item No.	Jaw Length	List	Sale	Box of 6
3706	6"	8.85	5.99	33.95
3712	12"	9.81	6.49	36.75
3718	18"	10.83	6.99	39.70
3724	24"	11.83	7.59	43.10
3730	30"	13.19	8.59	48.75
3736	36"	14.43	9.49	53.95

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
50	¾" black pipe clamps	12.48	7.50	80
52	½" black pipe clamps	10.41	6.00	65

STYLE J. ADJUSTABLE HANDSCREW KITS

Model	Length Jaws	List	Sale
J04	4	7.10	5.39
J06	6	8.13	5.89
J08	8	9.12	6.59
J10	10	10.66	7.29
J12	12	13.21	8.59

BOSCH

Model		List	Sale
1581VS	Top hdle. jig saw	239	129
1582VS	Barrell grip jig saw	225	123
Bosch metal case for above jig saws		34	28
Bosch blade assortment for jig saws 30 of Bosch's best selling blades		23.99	
1942	Heat gun 650º-900º	99	69
3268	Heat gun 600º & 1000º	89	65
1272	3"x24" belt sander	279	165
12720	3"x24" B.S. w/bag	299	175
1273	4"x24" belt sander	295	169
12730	4"x24" B.S. w/bag	315	179
11-212VSR	Bulldog ¾" SDS rotary	339	189
1195VSRK	¾" v/spd hammer drill	215	110
1195VSR	½" v/spd hammer drill	229	129
1608	5.6 amp lam trimmer	140	89
1608L	Same as above w/trimguide	145	92
1608T	5.6 amp tilt base trimmer	159	99
1609	5.6 amp offset base trimmer	205	122
1609K	Lam installers kit w/1609	295	169
Offset base, trimmer tilt base, trimguide, ¼" collet, collet nut, wrenches, hex keys and case			
1601	1 H.P. Router 25,500 rpm	165	105
1602	1½ H.P. Router 25,000 rpm	199	125
1603	1½ H.P. D handle router	223	135
1604	1¾ H.P. 2 hdle. router	219	118
1604K	Same as above w/case & access.	269	159
1606	1¾ H.P. D hdle. Router	243	145
3258	3½" planer w/blade guard	210	129
3270D	3"x21" belt sander w/bag 5A	225	135
1273DVS	V/spd. 4x24 belt sander	339	189
1611	3 H.P. plunge router	349	198
1611EVS	"NEW" 3 H.P. elec. v/spd. plunge router	410	255
1651	7¼ circ. saw drop foot	179	99
1654	7¼ circ. saw pivot base	179	99
1632VSRK	Recip. saw 8.4A orb. v/spd.	225	135
3050 VSRK	"NEW" 9.6V v/spd cdls. drill w/case & 2 batteries	235	159

BOSTITCH AIR NAILERS

Model		List	Sale
N80C-1	Utility coil nailer	730	435
N80S-1	Stick nailer	760	435
T36-50	Sheathing & decking stapler	550	334
N12B-1	Coil roofing nailer	725	435
N60FN-2	Finishing nailer	595	365
T31	Brad nailer	245	159

SENCO AIR NAILERS

Model		List	Sale
SFN1	Finishing nailer 1" - 2"	377	268
SFN2	Finishing nailer 1½" - 2½"	571	395
SN2	General purpose 1⅞" - 3"	621	445
M2	General purpose 1⅜" - 2"	475	349
SN4	General purpose 2" - 3½"	685	475
LS2	Pinner ⅝" - 1"	351	255
SKS	Stapler ⅝" - 1⅛"	351	249
LS5	Pinner, 1"-1½"	399	289
PW-RFR	Roofer, ½"-1¼"	351	249

WORKMATES By Black & Decker

79-032	#200, 23#	103.00	75.00
79-033	#300, 28#	117.00	79.00
79-034	#400, 35#	152.00	99.00

JET TOOLS

Model	Description	List	Sale
JBS-14MW	14" band saw, 1 H.P.	482	385
JTS-10	10" table saw w/stand, 1½ H.P.	554	459
JTS-12	12" table saw w/stand, 1½ H.P.	630	509
JWS-18	½"spindle shaper w/stand, 1 H.P.	479	375
JJ-4	4" jointer, ½ H.P.	310	275
JJ-6	6" jointer, ¾ H.P.	465	379
JWP12	12½" bench planer, 2 H.P.	569	389
JSG-6	6" x 48" belt & 12" disc sander, 1½ H.P.	634	475
OR1012	10" bench drill press, ½ H.P.	179	175
OR1458	14" bench drill press, ½ H.P.	279	259
OR1758	17" bench drill press, ½ H.P.	319	285
OR1458F	14" floor drill press, ¾ H.P.	369	325
OR1758F	17" floor drill press, ¾ H.P.	395	339
OR2501F	20½" floor drill press, 1 H.P.	655	525

RYOBI SPECIALS

Model	Description	List	Sale
R500	2¼ H.P. plunge router	326	159
TS251U	10" miter saw	392	179
TS251US	10" miter w/acc. kit & B & D 73-770 carbide blade	435	225
AP10	10" surface planer 13 amp	820	358
RA200	8¼" radial arm saw	515	245
RE600	3 H.P. plunge router	398	199
R150K	1 H.P. plunge router w/case	206	99
BE321	3"x21" v/spd. belt sander	259	125
BD102ARK	7.2v cdls. drill w/case	193	79

PORTER CABLE

630	1 H.P. router 6.8 amp	175	110
690	1½ H.P. router 8 amp	225	120
691	1½ H.P. router D hdle	245	135
536	1½ H.P. speedmatic router	310	195
518	3 H.P. 5 speed router	560	335
520	3 H.P. 15 amp router	510	315
369	3.8 amp lam trimmer	135	85
695	1½ H.P. router/shaper	310	195
596	H.D. shaper table	170	119
351	3"x21" belt sander w/o bag	225	125
352	3"x21" belt sander w/bag	235	129
360	3"x24" belt sander w/bag	310	179
361	3"x24" belt sander w/o bag	290	169
362	4"x24" belt sander w/bag	325	185
363	4"x24" belt sander w/o bag	310	179
7556	½" right angle drill	295	175
315-1	7¼" top hdle 13 amp circ saw	195	115
9315-1	315-1 comp w/case & carb bld.	225	129
617	7¼" push/handle 13 amp	195	115
9617	617 comp w/case & carb bld	225	129
368-1	8¼" top handle 13 amp	205	135
314	4½" trim saw 4.5 amp	215	125
548	X HD bayonet saw	265	169
9548	X HD bayonet saw w/case	290	179
9529	Recip saw w/sp 8 amp	235	135
9627	Recip saw 2 speed 8 amp	225	125
666	⅜" H.D. v/sp drill 0-1200 rpm	185	122
621	⅜" H.D. v spd. 0-1000 rpm	155	95
320	Abrasive plane 3 amp	160	99
9118	Porta plane 7 amp kit	335	189
9652	Versa plane 10 amp kit	430	275
7545	0-2500 drywall gun 5.2 A	169	99
7540	0-4000 5.2 amp gun	165	98
505	½ sheet pad sander	195	114
7511	⅜" v spd. drill 5.2 amp	185	109
7514	½" v spd. drill 0-750	195	119
303	Paint remover	235	149
304	7" disc sander 4000 rpm	200	125
305	7" disc polisher 2000 rpm	200	129
367	3¼" planer 6.5 amp	225	145
537	1½ H.P. D hdle router	325	199
7548	Top hdl jig saw 4.8 amp	230	125
7548	Barrel grip jig saw 4.8 amp	225	135
330	Speed block sander ¼ sht	97	58
555	Plate biscuit jointer w/cse	299	165
345	6" saw boss 9 amp	170	99
5050	"Stair Ease" stair templet	194	125
5051	"Stair Ease" hard wood	204	135
559	0-4000 drywall gun 4 amp	130	79
100	⅞ H.P. router	165	99
5008	Dovetail template kit	99.50	79
5009	Mortise & Tenon jig	64.95	49
7308	laminate slitter	190	129
5116	omni-jig	395	269
9647	TIGER CUB recipro saw	195	119
9850	12 volt cordless drill w/case	230	129
8500	Extra 12v battery	48	33
NEW Tools By Porter Cable!			
7399	5.6 amp drywall cutout unit	120	79
7310	5.6 amp lam trimmer	145	95
7312	5.6 amp offset base lam trimmer	209	125
7313	5.6 amp tilt base lam trimmer	165	105
97310	LAM TRIM KIT W/STD. BASE, TILT BASE, OFFSET BASE, SLITTER BASE, GUIDE & CSE	330	189
7334	3.7 amp 5" random orbit sander 6000 rpm	205	125
693	1½ H.P. plunge router	260	169
97750	½" v/spd hammer drill w/case	260	169
6931	Plunge router base	120	79

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GENTLEMEN, START YOUR DREMELS

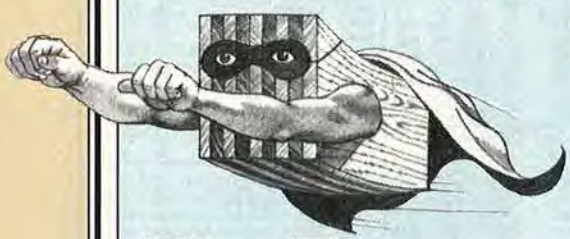
OK, the contest isn't just for men and you don't have to use Dremel's motorized carving tools, but it sure is time to make plans if you want to enter or observe the second annual Dremel/Ducks Unlimited Masters Carving Competition. The event happens February 23–25 at the lakeside Racine Festival Hall in Racine, Wisconsin.

According to the sponsors, 142 carvers and about 5,000 spectators showed up for the 1989 inaugural edition. The competitors entered 367 carvings and vied for $10,000 in prize money.

For information on entering and show hours, contact Dremel at 4915 21st St., Racine, WI 53406, or call 414/554-1390.

The falcon carved by Greg Woodward of Pleasant View, Utah, captured top honors in the decorative professional class in the 1989 Dremel/Ducks Unlimited Masters Carving Competition.

LOOK! UP IN THE RAFTERS!



IT'S . . . IT'S . . . IT'S SUPERWOOD!

Cheaper than concrete! More resilient than steel! Such claims are being made for Parallam, a new material for beams created by the MacMillan Bloedel Company of Vancouver, British Columbia.

Here's the process: Peel a log into sheets ⅛" thick, then cut the sheets into strands 6–10' long and about 1" wide. Next, laminate 100 or so of the strands together lengthwise in layers and cure them with microwaves for a product the company says competes with steel and concrete.

HOW ABOUT THIS STUMPER?

Sculptor Barry Pinske's solution to an interesting problem: What to do with a leftover elm tree trunk? Above, Barry starts on the trunk. Left, 3½ days later.

When the utility company finished pruning away the huge red elm from the power lines, Mike and Joyce Messner of Gaylord, Minnesota, were left with an ugly, branchless trunk 15' tall. To cut it all the way down for firewood was an unseemly end for the old tree, and would have laid bare their backyard.

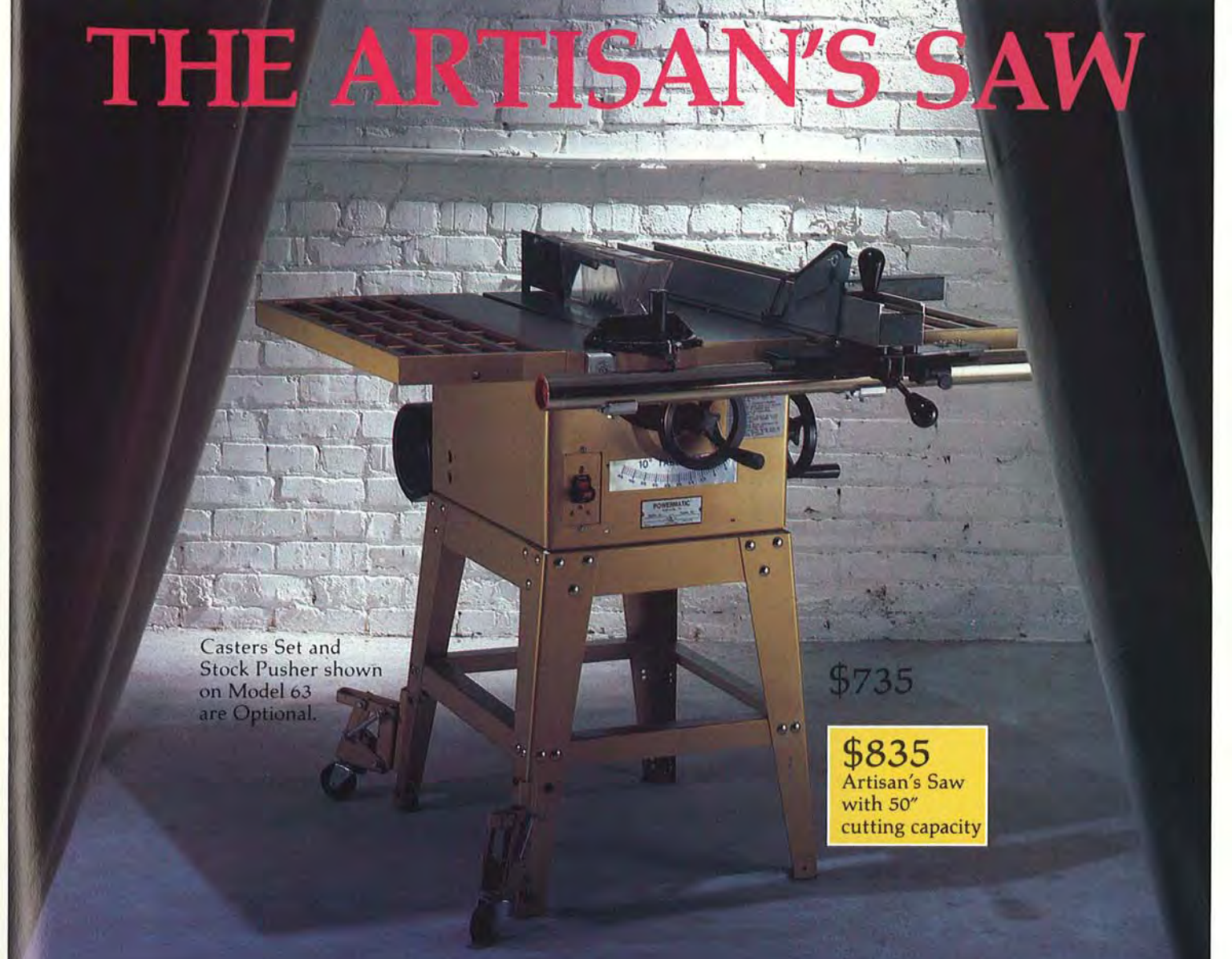
After a few months of pondering their next step, they called in a friend's relative, chain-saw carver and sculptor Barry Pinske, then of Shakopee, Minnesota. When Pinske—who has won several chain-saw carving competitions—finished, the Messners were left with a striking sculpture of an eagle with a fish in its talons soaring over pine trees and a waterfall.

"It only took him about 3½ days of work," said Mike Messner, a retired mason. "We told him we wanted an eagle, and he did it all with four chain saws and no plans." Pinske then finished the sculpture with linseed oil and polyurethane varnish. Total price of the project: $750.

The tree turned into a bird in the summer of 1987. Since then, word of the unique backyard centerpiece has spread widely, and brought the Messners plenty of visitors. "People have been here from all over," Messner said. "And every time the neighbors have guests, of course they end up coming over, too."

Photographs: The Dremel Corp.; James E. Deis Illustration: Jim Stevenson

THE ARTISAN'S SAW



Casters Set and Stock Pusher shown on Model 63 are Optional.

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$835
Artisan's Saw with 50" cutting capacity

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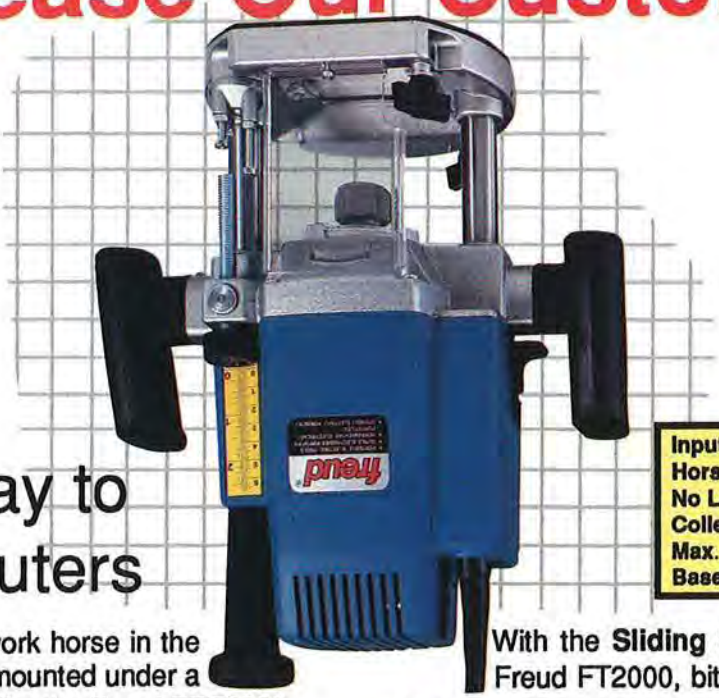

Input 15 Amps	120 Volts AC
Horsepower	3-1/4
No Load RPM	22,000
Collet Capacity	1/4",3/8", 1/2"
Max. Plunge Depth	2-3/4"
Base Diameter	6-5/8"

Another Way to Look at Routers

The router has become a work horse in the wood working shop. When mounted under a

router table like the Freud FRT2000, the router can take the place of a more expensive spindle shaper.

Freud's new FT2000, 3-1/4 HP Plunge Router with 1/2 inch collet has been engineered with your needs for a versatile and safe tool in mind. The mighty **3-1/4 HP** motor is the most powerful you can buy!!

FOUR major features separate the FT2000 from other routers and make it a pleasure to use!

The **Long Collet**, 1-3/8 inch, has 6 constricting slots. This feature allows for a longer, more even grip of the bit shank.This decreases run out found on routers with shorter, single slotted collets and increases operating safety.

The **Micro-Adjustment Depth Control** makes accurate vertical settings quick and easy. No more twisting of the router body or "hit & miss" plunging with inaccurate measurements and difficult locking devices. An effortless turn of the knob does the trick! This makes table mounted adjustments a snap!

With the **Sliding Shaft Lock** found on the Freud FT2000, bit changing is simple, safe and easy. Only the one wrench provided is needed. No more busted or bruised nuckles and hands!! This is best appreciated when changing a bit with your router mounted under a table.

Safety was an important factor when the on-off switch and the plunge lock were designed! They would need to be released at the same time in the case of an emergency. Both are designed with a downward stroke to disengage each feature.

The *on-off switch* is located on the side of the router. A simple flick of the left thumb while holding the handle turns the machine on-off.The *plunge lock* is located by the right handle. It can be conveniently operated by the fingers of the right hand.

A 1/4 inch collet reducer and collet wrench are standard with this powerful machine. Optional accessories include micro-adjustment parallel fence and a set of template guides.The FT2000–3-1/4 HP Plunge Router List: $299.90 Call today for the name of your local Freud distributor!

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